Feb. 6, 1934. B. G. GOBLE 1,945,774

PUMP JACK

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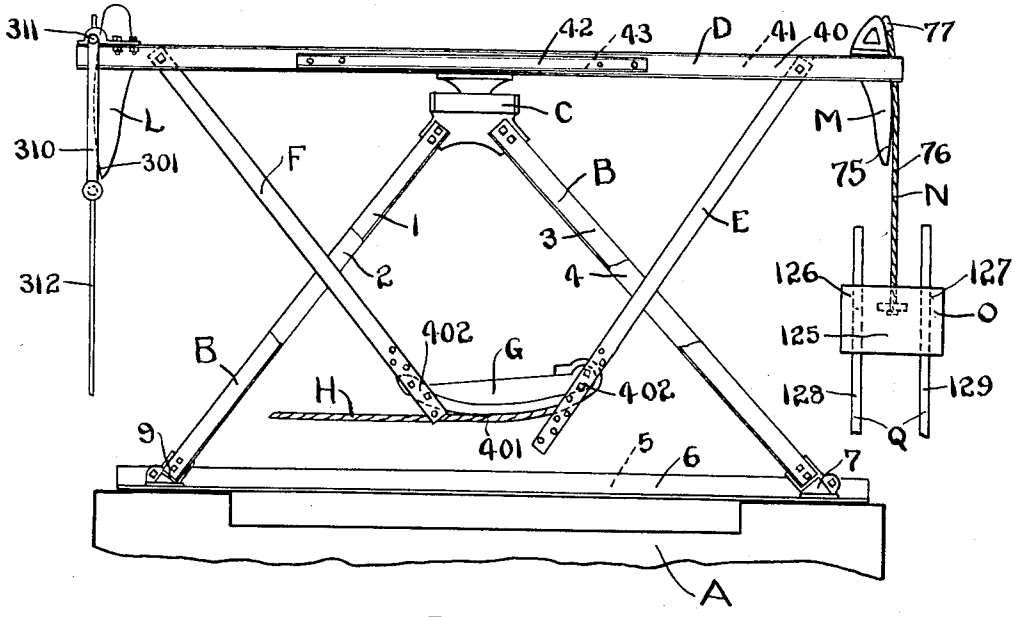


Fig. 1.

Fig. 2.

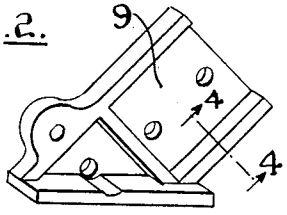


Fig. 4.



Fig. 3.

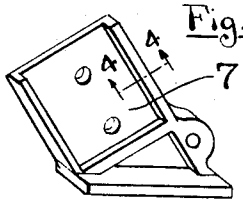


Fig. 5.

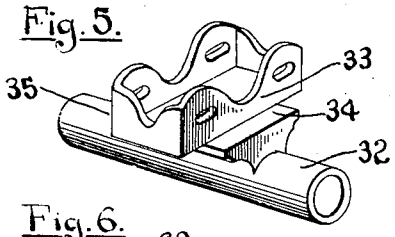


Fig. 6.

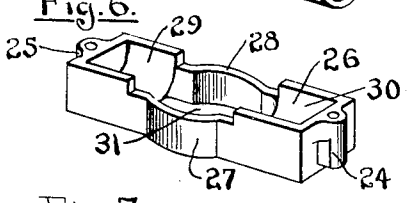
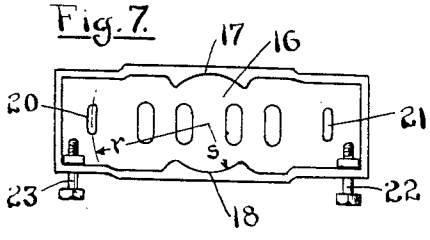


Fig. 7.



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1,945,774

PUMP JACK

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Application October 1, 1928. Serial No. 309,477

3 Claims. (Cl. 74—14)

My invention relates to an improved pumping jack and more particularly to a type of jack wherein the beam may be adjusted with respect to its bearing so that proper positioning of either or both of its ends may be obtained.

This invention is somewhat similar to that disclosed in my patent for a Well pumping jack, No. 1,888,530, allowed November 22, 1932.

In pumping oil wells, the pump rod is reciprocated by means of a beam, the string of rods being fastened to one end of the beam and the incoming power being applied to some point distant from the fulcrum. In all cases, more especially when the wells to be pumped are of considerable depth, it is desirable to have the reciprocating power as steady as possible. The jacks in use at the present day are deficient in that their motion is more or less irregular. This is due to the fact that a varied pull is necessary at different parts of the stroke and also to the fact that the counterbalance does not reciprocate in a vertical plane but moves toward and from the fulcrum center. Still another cause of irregularity in the motion of the several reciprocating parts, as well as causing deterioration of the equipment, is the fact that no adjustments are provided whereby all of the parts may be kept strictly in proper alinement.

Figure 1 is a side view of my varied leverage underpull pumping jack.

Figure 2 shows a perspective view of one of the angle castings for the front legs of the main frame.

Figure 3 shows a perspective view of one of the angle castings for the back legs.

Figure 4 shows a view along lines 4—4 of either Figures 2 or 3.

Figure 5 is a perspective view of the journal casting which is bolted to the top members of the triangular rocking frame.

Figure 6 is a perspective view of the box like bearing seat for the journal shown in Figure 5.

Figure 7 is a plan view of the base casting, said casting being bolted to the upper ends of the four upwardly extending angles of the main frame.

The main frame

Referring now to the drawing and more definitely to Figure 1, A designates a suitable base upon which the triangular base frame B is fastened.

C designates, generally, the turntable box bearing in which the triangular shaped walking beam is pivotally mounted. Arms E and F extend downwardly from a beam D and a curved rocker G adjustably interconnects the lower ends of these downwardly converging members E and F. A shackle rod line (not shown) is flexibly connected to the rocker G by means of the chain or cable H.

The curved member L is mounted on the front end of the walking beam and compensates for the lateral movement of the polish rod. At the other end of this beam a similar rocker M is also mounted. This rocker provides for the vertical movement of the counterweight O which is flexibly supported by means of the cable N. Guiding means Q are provided for the counterweight.

Thus, from the above description, it will be seen that I have invented a combination of elements which perform their ultimate duty of pumping in an extremely satisfactory manner. By means of the several adjustments which I provide, the jack may be kept in exact alinement with subsequent freedom from wear and breakage.

It is pointed out in this regard that the loads on a pump jack are sometimes tremendous and hence even a very slight misalinement of parts causes a bending to occur in said parts with the result that they crystallize and break. This breaking may occur in the polish rod which leads into the well with the result that the entire string of rods is dropped, perhaps rupturing them at some point along their length. Thus a fishing job, distasteful at the best, is necessitated.

I provide for the alinement of the several parts by means of the central fulcrum bearing C which allows the beam D to be turned about a vertical axis. Furthermore, the bearing box containing the journal, which is rigidly fastened to the beam D, is made slightly longer than the journal itself. This allows the beam D to seek its own plane of motion by shifting laterally. This motion is very slight, however. A further sidewise movement is allowed by means of slots formed in the main base angles 5 and 6. The two rockers, L and M, are adjustable along the beam D and this third adjustment completes the system by which perfect alinement may be obtained.

Referring now to the member G, it will be noted that there are a number of different positions in which it may be placed and by trial and error the most efficient of these positions for a particular well may be readily determined. This is, of course, that position of the rocker which requires a steady even pull to operate it throughout the stroke.

The triangular base frame is composed of side angles 1, 2, 3 and 4 and base angles 5 and 6. The side angles 3 and 4 are fastened to the base angles at one end by means of angle castings 7. Figure 3 shows one of these castings 7. Side members 1 and 2 are fastened to the base angles 5 and 6 by means of angle castings 9. Figure 2 discloses one of the angle castings 9. Figure 4 shows the depression formed around the edges of the castings whereby a tight fit may be obtained between the angle iron and its seat.

The upper ends of all of the side angles are fastened together by the box casting C as clearly shown in Figure 1.

Adjustable fulcrum bearing

Figure 7 shows a view of the main box like casting 16 of the adjustable fulcrum bearing. This rectangular box member has two arcuate surfaces 17 and 18 which are formed so as to have radii equal to *s*. Large slots are formed in the bottom of this casting in order to lighten it. Smaller slots, 20 and 21, are formed with radii *r*. Adjusting studs, 22 and 23, are inserted through the side walls of the box member 16 and held in place by nuts abutting the ends of the box.

A smaller box like member 26 has curved surfaces 27 and 28 which are of the same radii as the surfaces 17 and 18. Thus, these surfaces contact and allow the box to turn, thus providing a circular adjustment for the beam about a vertical axis. Box 26 is also provided with lugs 24 and 25 against which the studs 22 and 23 are adjusted, thereby holding the inner box in a fixed position. The inner box is provided with curved seats 29 and 30 which form a bearing seat for the journal member 32. A reservoir 31 is formed by bulging of the sides of box 26 and thus the journal runs in a bath of oil.

The journal member 32 seats in box 26 and has an upper attachment 33 formed integrally therewith. Shoulders 34 and 35 provide seats for the channel members 40 and 41 which are bolted thereto. Short channel members 42 and 43 are used to strengthen the beam D.

The cast rocker M is formed with an arcuate surface 75, which is formed in a curve which has a radius equal to the distance to the fulcrum point. A cable 76 is fastened near the top of the rocker M by means of a clamp 77 and hangs downwardly along the curved surface 75.

The lower end of this cable 76 is connected to the counterweight O. The counterweight has holes 126 and 127 therein. Guide pipes 128 and 129 are rigidly embedded in a concrete base and extend through the holes in the counterweight. Thus guiding means is provided for the counterweight.

I claim:—

1. An adjustable pump jack comprising a support, a bearing, means for revolubly mounting said bearing on said support, a frame, a journal rigid with said frame and seated in said bearing, a member adjustably fastened to said frame and having an arcuate surface formed thereon relative to the pivotal point of the frame, flexible means fastened near the top end of said surface, counterweight means fastened to the other end of said flexible element whereby it contacts said arcuate surface.

2. An adjustable pump jack comprising a support, a bearing, means for revolubly mounting said bearing upon said support, a frame, a journal rigid with said frame and seated in said bearing, a counterweight, means for supporting said counterweight from the said frame and stationary guiding means for guiding said counterweight, said bearing being turnable in said support whereby exact alinement of the counterweight and its guiding means may be maintained.

3. An adjustable pump jack comprising a support, a bearing, means for revolubly mounting said bearing upon said support, a frame, a journal depending from said frame and seated in said bearing, a movable operating member, means for fastening said operating member to the said frame and guiding means for guiding the said operating member, said bearing being turnable in said support to maintain alinement of the operating member and guiding means.

BERT G. GOBLE.