July 15, 1924.

1,501,226

E. A. MALBAFF

MULTIPLE BALANCED PUMP JACK

Filed Oct. 26, 1923 2 Sheets-Sheet 1

Fig. 1.

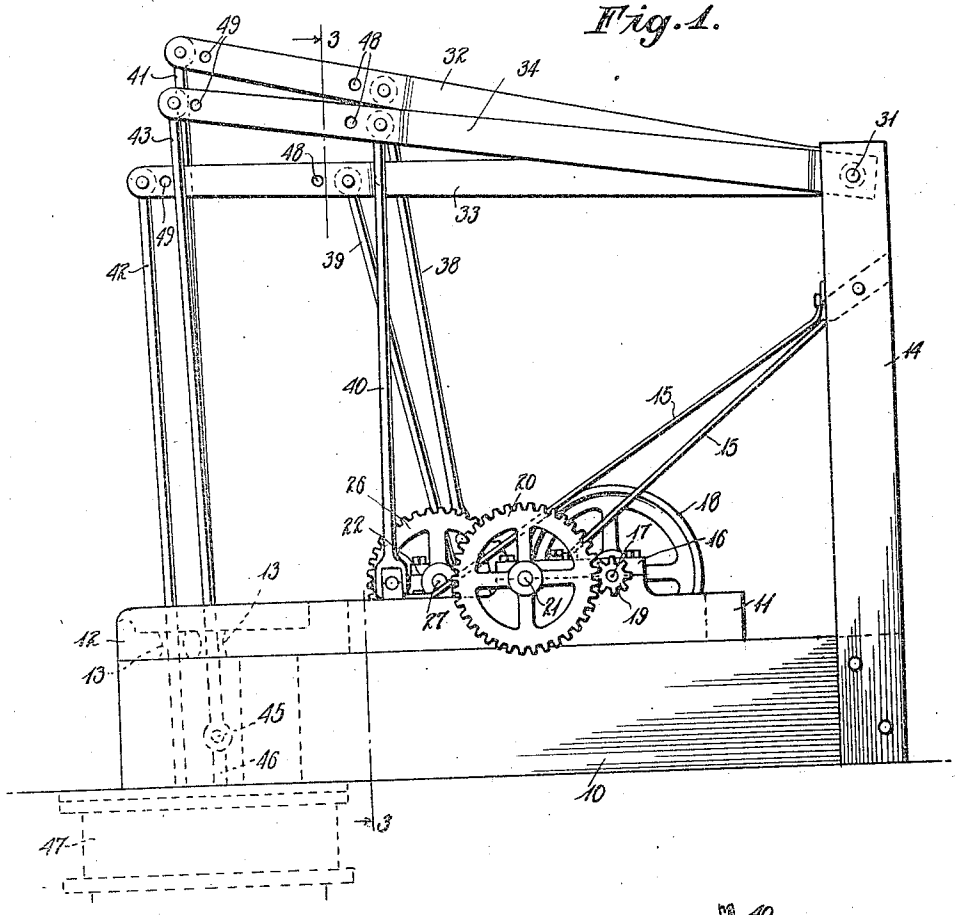


Fig. 4.

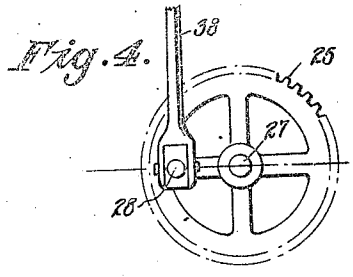


Fig. 5.

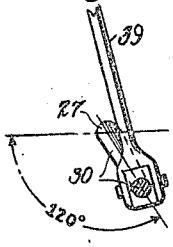
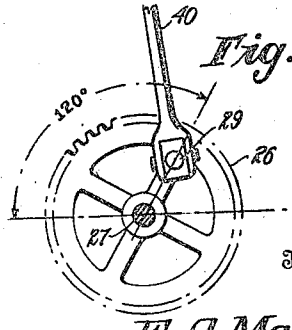


Fig. 6.



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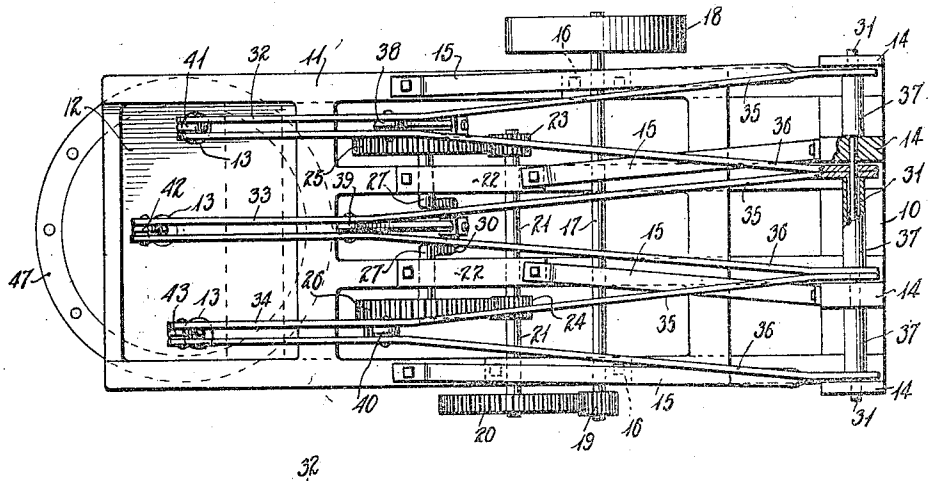
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Fig. 2.



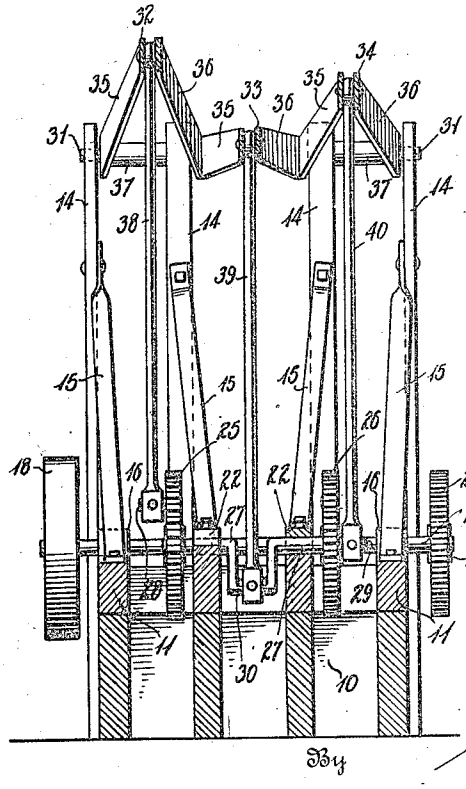


Fig. 3.

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UNITED STATES PATENT OFFICE.

EDWARD A. MALBAFF, OF FLAGLER, COLORADO.

MULTIPLE BALANCED PUMP JACK.

Application filed October 26, 1923. Serial No. 670,279.

To all whom it may concern:

Be it known that I, EDWARD A. MALBAFF, a citizen of the United States, residing at Flagler, in the county of Kit Carson and State of Colorado, have invented certain new and useful Improvements in Multiple Balanced Pump Jacks, of which the following is a specification.

This invention relates to multiple balanced pump jacks, and has for one of its objects to provide a device of the character described which will be simple in construction, comparatively inexpensive to manufacture and install, and more efficient in use than those which have been heretofore proposed.

While not specifically limited to any particular class of work, the invention is particularly adapted for use with pumps which supply water from wells, and among other things it provides a pump jack which is so balanced that it will supply a constant flow of water without pulsation or vibration such as is commonly present in small installations of this character. Furthermore, owing to the fact that one or more of the pump pistons is always performing a working stroke, the strain upon the driving motor, as well as upon the other parts of the apparatus is substantially constant, thereby reducing the wear and tear upon the device to a minimum. It also permits of the use of a smaller motor to accomplish the same results.

With the above and other objects in view, which will appear as the description proceeds, the invention consists in the novel details of construction, combinations and arrangements of parts, more fully hereinafter described, and particularly pointed out in the appended claims.

Referring to the accompanying drawings, forming a part of this specification, in which like reference characters designate like parts in all the views;

Figure 1 is a side elevational view of a jack constructed in accordance with the present invention;

Fig. 2 is a top plan view, partly broken away, of the parts shown in Fig. 1;

Fig. 3 is a vertical cross sectional view of the parts shown in Fig. 1, taken approximately on the plane indicated by the line 3—3 of the said figure, looking in the direction of the arrows; and,

Figs. 4, 5 and 6 are diagrammatic sectional elevational views, showing the relative positions of the various crank members.

Referring more particularly to the said drawings the numeral 10 indicates a base which may take the form of a suitable casting or which may be, if desired, fabricated from metal or wood.

Suitably mounted upon the top of the said base member 10 is a sur-base 11, one end 12 of which is, or may be, substantially solid, provided with a plurality of holes or apertures 13 to accommodate pump rods, as will presently appear.

Rigidly secured to the base member 10 is a plurality of upright members 14, which may be traced by suitable diagonal members 15, extending from the said uprights 14 to the sur-base 11, as will be clear from Figs. 1, 2 and 3.

Extending horizontally across the top of the sur-base 11 and journalled in suitable bearing blocks 16, carried thereby, is a power shaft 17, rigidly carrying at one end a driving pulley 18 and at its other end a gear or pinion 19, which meshes with a companion gear 20, rigidly carried by the counter-shaft 21, also extending horizontally across the top of the sur-base 11 and journalled in suitable bearing blocks 22 mounted thereon. The said counter-shaft 21 has rigidly secured to it in spaced relation, a pair of pinions 23 and 24, which mesh respectively with gears 25 and 26, rigidly mounted upon a crank shaft 27, which is also journalled in the bearing blocks 22.

The gears 25 and 26 are provided respectively with crank pins 28 and 29, while the shaft 27 is provided with a crank portion 30, the said pins and crank portion being arranged at angles of substantially 120 degrees from each other, as indicated more clearly in Figs. 4, 5 and 6.

The upper ends of the upright members 14 carry the horizontal rod or shaft 31, upon which are pivotally mounted three walking beams, 32, 33, and 34, each of which is preferably composed of a pair of spaced bars, 35 and 36, substantially as shown. The ends of each pair of bars which are pivotally mounted upon the shaft 31 may

be maintained in spaced relation by suitable sleeves or collars 37, surrounding said shaft 31, and the said bars preferably converge, as clearly shown in Figs. 2 and 3, to pivotally engage the upper ends of suitable connecting rods 38, 39 and 40, the lower ends of which are respectively received by the crank pin 28, the crank member 30 and crank pin 29, as will be readily understood.

As will be clear from the drawings, the said connecting rods 38, 39 and 40 are pivotally connected to the walking beams 32, 33 and 34, intermediate the ends of the latter, and the extreme left hand ends of the said beams, as seen in Figs. 1 and 2, pivotally receive the upper ends of the pump operating rods 41, 42 and 43. These said rods extend downwardly through the holes or apertures 13, provided in the portion 12 of the sur-base 11, and are pivotally connected as at 45 to the piston rods 46 of the pumps which, as is well known in this art, are located below the surface of the ground within the well casing 47.

The walking beams 32, 33 and 34, may, if desired, be provided with additional holes or apertures 48, intermediate their ends, whereby the pivot connections between the said beams and the connecting rods 38, 39 and 40 may be shifted, if desired, and the said beams may further be provided with additional holes or apertures 49, adjacent their left hand ends, so that the pivotal connections between the said beams and pump operating rods 41, 42 and 43, may likewise be shifted, if desired. Provision is thus made for accommodating the jack to pumps having different piston travels, as will be readily understood.

The operation of the present jack will be clear from the foregoing but it may be briefly summarized as follows. Power, being supplied to the pulley 18 from any suitable source not shown, will be transmitted from the shaft 17 to pinion 19, and gear 20, carried by counter-shaft 21, and from pinions 23 and 24 carried by the said counter-shaft to the gears 25 and 26, and the crank shaft 27. The rotation of the said crank shaft and the gears 25 and 26 will, through the crank pins, 28 and 29, and the crank portion 30 of the shaft 27, produce reciprocating motion of the connecting rods 38, 39 and 40, which motion will be translated into an oscillatory motion of the walking beams 32, 33 and 34. The movement of the walking beams will, in turn, be transmitted to the pump operating rods 41, 42 and 43, and in turn to the pump piston rods 46, pivotally connected to the said operating rods, thereby reciprocating the pump pistons in the well known manner.

It will be observed that due to the fact that three walking beams and operating rods are provided which are actuated by crank members set at substantially 120 degrees apart, that at least one of the pump pistons will always be performing a working stroke, and that the said working strokes will overlap one another to such an extent as to provide an even flow of fluid at all times during which the apparatus may be working without the usual pulsation or vibration common in apparatuses of this type where the working strokes do not overlap. Furthermore, owing to the fact that at least one of the pistons is always performing a working stroke, the source of power is subjected to a more constant pull, which not only tends to reduce the wear and tear upon the motor but also upon the various operating parts of the jack.

While one form of the invention has been illustrated and described, it is obvious that those skilled in the art may vary the details of construction as well as the arrangements of parts without departing from the spirit of the invention, and therefore it is not wished to become limited to the above disclosure except as may be required by the accompanying claims.

What is claimed is:

1. A device of the class described comprising a base; upright standards rigid with said base; a plurality of walking beams pivotally mounted on said standards; a power shaft journalled on said base; a crank shaft also journalled on said base; gear connections between said power and crank shafts; crank pins carried by the gears upon said crank shaft; connecting rods connecting said crank pins and the crank portion of said crank shaft with said walking beams; and pump operating rods carried by the ends of said walking beams.

2. A device of the class described comprising a base; upright standards rigid with said base; three walking beams pivotally mounted on said standards; a power shaft, a countershaft, and a crank shaft journalled on said base; gear connections between said power and counter shafts; a pair of pinions carried by said countershaft; a pair of gears carried by said crank shaft, meshing with said pinions; a crank pin carried by each of said gears, said pins and the crank portion of said crank shaft being substantially equidistantly arcuately spaced; rods connecting said crank pins and the crank portion of said crank shaft with said walking beams; and pump operating rods carried by the ends of said walking beams.

3. A device of the class described comprising a base; upright standards rigid with one end of said base; three walking beams pivotally mounted at one end on said standards; a power shaft, a countershaft, and a crank shaft journalled on said base; gear connections between said power and counter-

shafts; a pair of pinions carried by said countershaft; a pair of gears carried by said crank shaft, meshing with said pinions; a crank pin carried by each of said gears, said pins and the crank portion of said crank shaft being substantially equidistantly arcuately spaced; rods connecting said crank pins and the crank portion of said crank shaft with said walking beams intermediate their ends; and pump operating rods carried by the other ends of said walking beams.

In testimony whereof I affix my signature.

EDWARD A. MALBAFF.