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E. W. PATTERSON

2,576,765

ECENTRIC CRANK PIN MOUNTING

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Fig. 1.

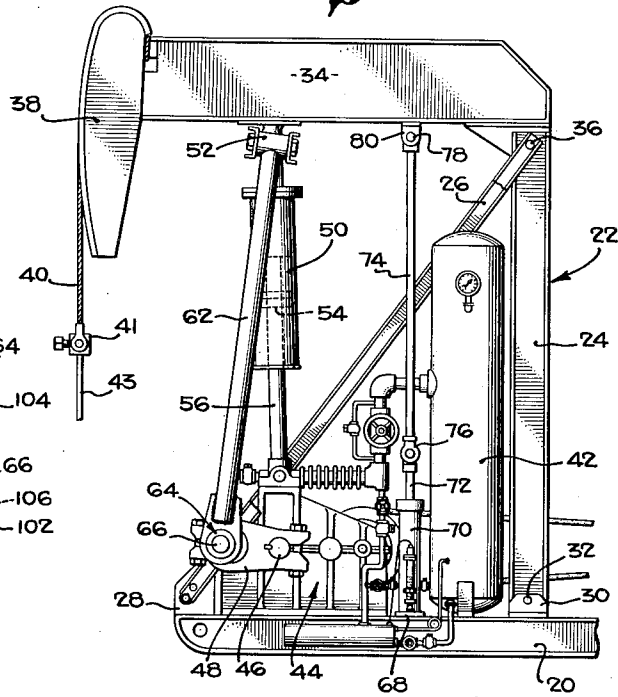


Fig. 5.

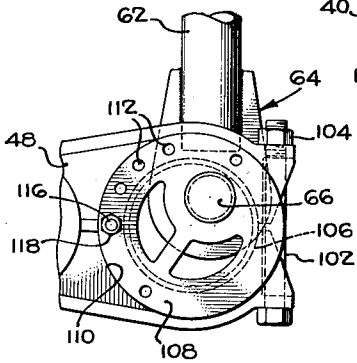


Fig. 2.

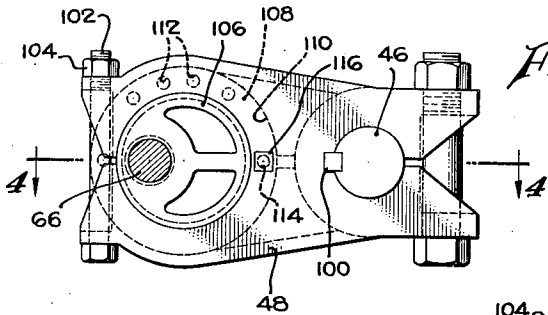


Fig. 3.

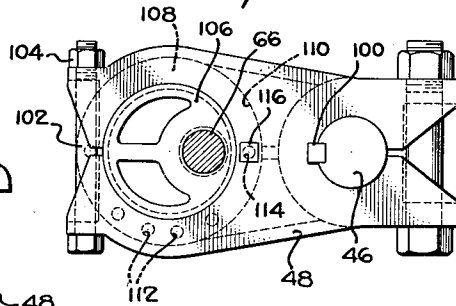
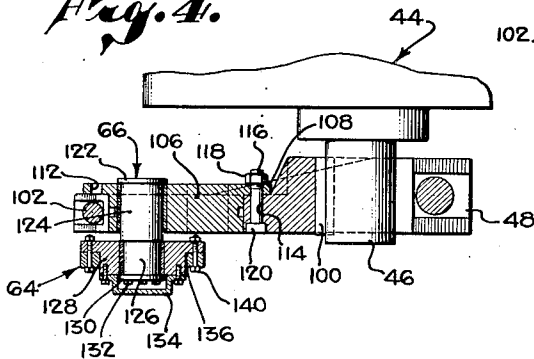


Fig. 4.



INVENTOR.

Edgar W. Patterson
BY *Edgar W. Patterson*
ATTORNEY

UNITED STATES PATENT OFFICE

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ECCENTRIC CRANK PIN MOUNTING

Edgar W. Patterson, Downey, Calif.

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1 Claim. (Cl. 74-600)

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This invention relates to a crank member which may be used, for example, in an air balanced pumping unit such as shown in my United States Patent 2,169,815 and others, and includes among its objects the provision of an improved mounting assembly for an adjustable oscillating drive rod or pitman rod.

In prior constructions, such as above referred to, an oil well pumping element such as a walking beam is pivoted to a stationary support at one end and oscillated by intermediately attached dependent drive rods, connected to a source of power by a rotating crank arm. Since operating conditions require a variation or adjustment of the span of oscillation of the walking beam from time to time, this is accomplished by altering the point of attachment of the drive rods to the crank arm, thereby increasing or diminishing their effective stroke length. Such adjustment has been made in the past by employing a crank member having a number of crank pin holes for the crank pin of the drive rod, progressively spaced outward from the center of rotation of the crank. Consequently it has been necessary when changing the drive rods from one position to another to completely disconnect them from attachment to the crank arm, move them to a new attachment point and recouple them thereto. This has been a task requiring considerable time and effort since the weight of the walking beam and its attachments may be very considerable and requires the services of several men and heavy equipment.

Accordingly it is an object of the present invention to provide such a crank attachment which may be simply and quickly adjusted without disconnecting the crank pins from the crank. Such an arrangement has especial application to an air balanced oil well pumping unit and it effects great savings in time, labor, equipment and money.

In the drawings, which form part of the present specification:

Figure 1 is a side elevational view of a pumping unit embodying the present invention;

Fig. 2 is a side elevational view, somewhat enlarged, of my crank arm assembly with the drive rod removed;

Fig. 3 is a view of the crank member corresponding to Figure 2 but with the disk shown in the opposite position;

Fig. 4 is a transverse view partly in elevation, taken through the crank arm and attached drive rod along the line 4-4 of Figure 2; and

Fig. 5 is an elevational view of the disk and

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attached crank rod as seen from the other side of the pumping unit.

As seen particularly in Figure 1, there is provided a pumping unit supported jointly by a generally horizontal base 20, and an identical pair of upwardly extending, parallel, triangular members 22 disposed on opposite sides thereof. The individual members 22 are joined together by suitable bracing to form a vertically mounted Sampson post 24 and a pair of angular struts or supports 26, the latter having their ends secured respectively to the top of the upright 24 and adjacent the horizontal base 20, being affixed at the latter point to vertical brackets 28. The lower end of the Sampson post 24 is in turn attached to a pair of mounting shoes 30 of the base by means of a horizontal pin 32.

The conventional, generally horizontal walking beam 34 is pivotally secured at one end to the top of the Sampson post 24 by means of a fulcrum shaft 36 and carries at its opposite end a horsehead 38 over which the reins 40 of a pump polish rod are led into a cross-bar 41 to which the polish rod 43 is attached. The base of the unit is located adjacent the well head in such manner that the horsehead will be located directly thereabove in the conventional manner.

An air reservoir tank 42 is located adjacent the Sampson post and mounted on the base 20. Rotatably journaled in the conventional gear box 44 is a low speed drive shaft 46 to the ends of which is keyed a pair of crank members 48, one on each side of the gear box. The shaft 46 is operatively connected to a power unit by suitable driving means not shown in detail.

A cylindrical air balance cylinder 50 is pivotally supported by a universal mounting from a cross-head 52 affixed to the underside of the walking beam 34, the balance cylinder being thus adapted to reciprocate vertically along a stationary piston 54.

A pair of vertically swinging pitman rods 62 is pivotally secured to the cross-head 52 at its upper end and attached by a terminal crank pin bearing housing 64 to the crank member 48 by means of a horizontal crank pin 66 mounted in crank member 48.

Fixedly secured to the base adjacent the air reservoir by means of a footing member 68 is an upright compressor unit 70 having slidably extending from its upper end a piston rod 72 connected to a vertically disposed pair of drive rods 74 through a cross-head 76, the upper ends of the drive rods being provided in turn with hori-

zontal trunnions 78 transversely disposed in a dependent bracket 80 of the walking beam.

The drive rod 62 is connected to a drive shaft 46 by a fiat, elongated, rotatable crank member 48. The drive shaft is inserted through a corresponding opening in one end of the crank member and locked against independent rotation by an axially directed key 100 seated in a corresponding keyway along the inner edge of the shaft, while at the opposite end of the shaft the split parts of the crank member are clamped together by a transversely disposed, headed bolt 102 mounted in an aperture therethrough and bearing a tightening nut 104 threadedly mounted on its free end. This outer, somewhat enlarged end of the crank member is provided with a transverse aperture in which is seated an annular disk 106. Eccentrically mounted thereon is a transverse crank pin 66. The disk bears an outwardly extending flange 108 rotatably seated in a corresponding recess 110 formed along one side of the crank member.

The flange portion of the disk is provided with a series of transverse apertures 112 circumferentially spaced apart and selectively alignable (by rotation of the disk) with an aperture 114 located in the crank member and provided with a bolt 116 insertable jointly therethrough and through the aligned disk aperture so as to have a tightening nut 118 mounted on its free end to lock the disk in such position.

The crank pin 66 is formed with an integral, terminal flange 122 adapted to abut against the outer face of the disk upon insertion of the adjacent section 124 of the crank pin therethrough. The succeeding section 126 of the crank pin then extending beyond the crank is formed of reduced diameter so as to receive thereon a journal assembly 128 which thus seats against the shoulder formed between the two sections. On the opposite side of the journal assembly there is attached a terminal disk 130 by screws 132 so as to retain the journal assembly 126 on the crank pin.

The disk 130 is in turn enclosed by a cover plate 134 secured to the journal assembly. The latter is provided with an annular, right-angular groove 136 thereabout within which there is disposed the connecting plate 64 of the drive rod, being fastened securely thereto by bolts 140. The opposite end of the connecting plate is inserted in a terminal slot in the drive rod 62 and rigidly affixed thereto as by welding or other means. The split ends of the crank member adjacent the disk 106 are thus clamped together thereabout by means of the tightening bolt 102.

Accordingly it will be appreciated that the throw of the drive rod will vary with the distance at which the crank pin 66 is removed from the drive shaft 46 and that this distance is adjustable by rotation of the positioning disk 106. Consequently, it will be seen that the location of this disk can be readily changed by loosening the

nut 104 on the pinch bolt 102 and then removing the bolt 116 from the aperture 114. After aligning another disk aperture 112 therewith by rotating the crank pin to the desired location, the disk bolt 116 is reinserted, the nut 118 replaced thereon and the pinch nut 104 tightened. Such adjustment is both quickly and easily made, in marked contrast to the prior construction. Since it will be seen the several disk apertures 112 when aligned with the lock bolt 116 serve to locate the drive rod 62 at varied distances from the drive shaft 46, the effective stroke of the pump is accordingly adjusted the desired amount.

While I have shown and described in some detail a presently preferred embodiment of my crank unit it is to be understood that various modifications may be made in the construction and operation thereof within the spirit and scope of the subsequently claimed invention which is to be construed broadly and limited only by the prior art.

I claim:

An adjustable crank including a crank member having a circular opening therein, a slot extending from said opening to the edge of said crank member, a disc rotatably mounted in said opening, means for forcibly drawing the edges of said slot toward each other to tighten the walls of said opening about the periphery of said disc, a crank pin eccentrically positioned on said disc, said disc having a radially extending flange member thereon, and means for positively interlocking said flange member against rotation relative to said crank member, said means comprising an aperture in one of said members and a plurality of apertures in the other of said members, the aperture in the one member being alignable with any one of the apertures in the other member by rotation of said disc and flange member relative to said crank member, and a locking element extending through the aligned apertures.

EDGAR W. PATTERSON.

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