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J. GRANT ET AL

OPERATING HEAD FOR PUMPS AND THE LIKE

Filed April 29, 1925

*Fig. 1*

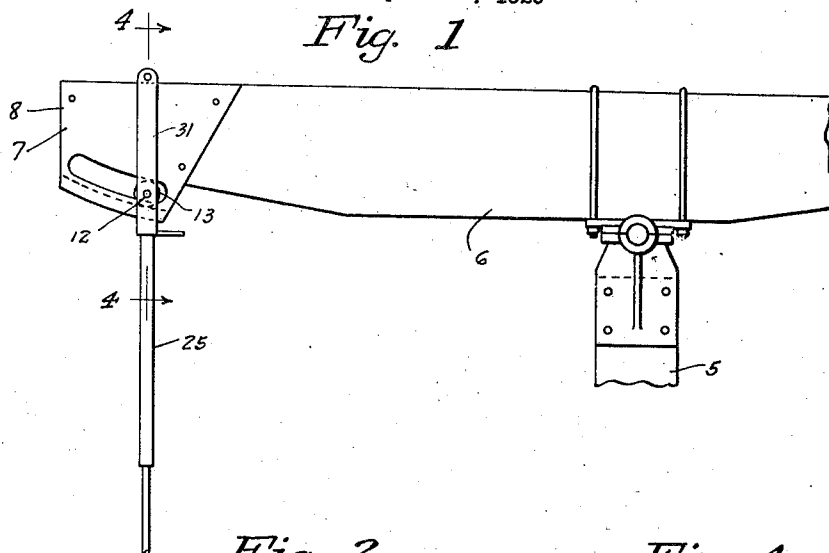


*Fig. 2*

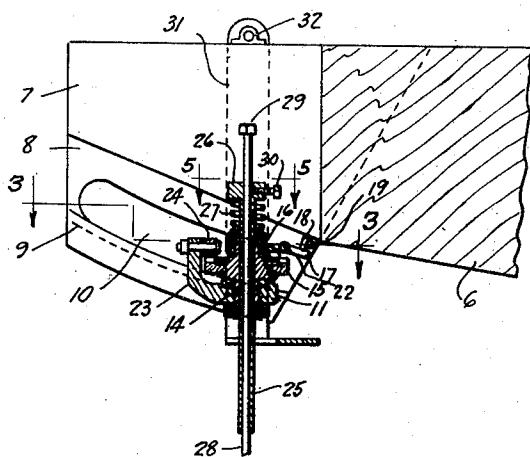


*Fig. 3*

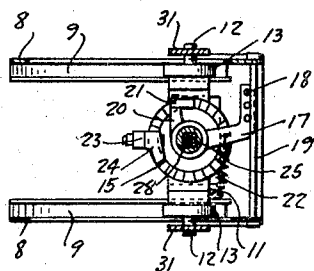


*Fig. 4*

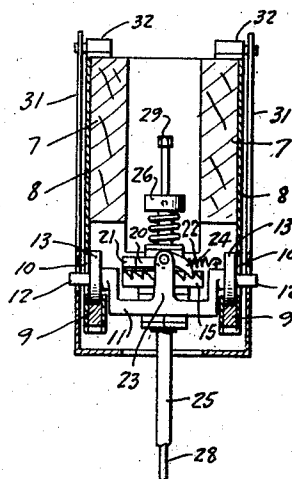
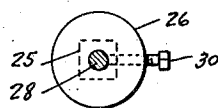


*Fig. 5*



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## UNITED STATES PATENT OFFICE.

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## OPERATING HEAD FOR PUMPS AND THE LIKE.

Application filed April 29, 1925. Serial No. 26,684.

This invention relates to an operating head for transmitting reciprocating motion from a source of power to a driven element through a walking beam. The present invention is disclosed as applied to a pump operating head for transmitting motion to the sucker rods of a reciprocating pump. Due to the arc of travel of any fixed point on a walking beam, rods directly connected thereto will be sprung laterally back and forth at each stroke. This is not as objectionable in a short stroke pump as a long stroke pump because of the shorter lateral movement. The present invention has for its primary object the provision of a hanger structure whereby a pump polish rod connected to the walking beam will have the pull of the latter continuously transmitted thereto in a straight line. Another object of this invention is to provide a structure which will cause the rods and pump piston to be turned. The objects together with other objects and corresponding accomplishments are obtained by means of the embodiment of our invention illustrated in the accompanying drawing, in which:

Fig. 1 is a side elevation showing a fragment of a walking beam and a polish rod with my improved hanger secured thereto; Fig. 2 is an enlarged view in section of the hanger; Fig. 3 is a section as seen on the line 3—3 of Fig. 2; and Fig. 4 is a section as seen on the line 4—4 of Fig. 1. Figure 5 is a section as seen on line 5—5 of Fig. 2.

Referring more particularly to the drawing, 5 indicates a Sampson post upon the top of which is mounted in the usual manner a walking beam 6. The end of the walking beam is bifurcated to provide legs 7. Secured to the walking beam at the end thereof is a frame consisting of side plates 8 carrying rails 9 of suitable curved form and disposed below slots 10 in the plate. The rails 9 are of channel form.

Riding on the rails is a carriage comprising an axle 11 having stub shafts 12 upon which are journaled wheels 13. The axle 11 is underslung and is provided at the center with an opening and bearing for a sleeve 14 having intermediate its ends a ratchet wheel 15 with laterally extending teeth. The lower end of the sleeve is suitably threaded to receive nuts for holding the sleeve in position upon the axle. The up-

per end of the sleeve is likewise threaded to receive nuts. Journaled upon the sleeve 14 is a collar 16 disposed at one end of an arm 17. At the other end of the arm 17 are a series of apertures adapted to receive a pin 18 which may be disposed in a selected hole. Bridging the plates 8 is a rod 19 arranged to be engaged by the pin 18. The carriage is arranged to roll back and forth along the rails, and at the end of the inward travel, pin 18 engages rod 19. Extending radially of the collar 16 is an arm 20 having a ratchet pawl 21 at the end thereof engaging the teeth on wheel 15. Thus, movement of the arm 17 in one direction will cause the pawl to engage the ratchet wheel and turn the latter. A spring 22 is secured to the arm 17 in such a manner as to tend to cause the pawl to be advanced. Engagement of pin 18 with rod 19 causes the pawl to be retracted. Extending from the axle 11 is an arm 23 having pivotally mounted thereon a pawl 24 engaging the ratchet wheel. This pawl is arranged to prevent retrograde movement of the ratchet wheel. A square sleeve 25 slidably extends through a square opening in sleeve 14. The upper end thereof is provided with a head 26, and interposed between the head and the axle is a compression spring 27. Extending through the sleeve is a sucker rod 28 having a head 29. The parts are so arranged that the head 29 will arrest any downward movement of sucker rod 28 and permit adjustably positioning the latter and holding it in place by a set screw 30. An upward pull upon the axle will cause the sucker rod to be moved upwardly. The weight of the polish rod, sucker rod, and attached parts will cause the latter to move downwardly by gravity and maintain it in position upon the carriage. The carriage rolls backwardly and forwardly upon the rails, and to prevent the axle from becoming disaligned, links 31 are pivotally secured to shafts journaled in bearings 32 at the top of the hanger. These links have slots at the lower ends through which the shafts 12 extend. Thus, the axle is maintained straight. The rails 9 are made of such curvature that at all working positions of the walking beam, the lowermost point of the curve is directly over the center line of the sucker rods. Thus, the carriage rolls back and forth, maintaining the sucker rods in a straight

line so that a direct straight pull is exerted by the walking beam upon the rods. The channels in the rails 9 may be filled with lubricant thereby aiding the operation. The connection of the sucker rod sleeve to the axle is such as to allow the rod to lift up through the axle, which is advantageous when the well sands up. The connection of the polish rod to the sleeve permits adjustment and also does away with the necessity of a clamp. This allows the rods to be lowered or raised as the fluid level changes. At the end of each inward oscillation of the carriage, the pawl arm 17 is arrested by the pin 18 striking rod 19. There is a cushioning action due to spring 22. The energy stored in the spring aids in starting the carriage rolling in the opposite direction. Each complete oscillation of the carriage causes the pawl and ratchet to turn the polish rod and connected parts, thereby rotating the piston within the pump, which is advantageous in producing even wear.

What we claim is:

1. In combination with an oscillatable beam and a reciprocable rod for operation thereby; a control comprising a hanger frame secured to said rod, a rail on said frame, a carriage having rollers riding on said rail, said rail being of such shape that in any working position of said beam the low part thereof is always in a straight line with said rod.

2. In combination with an oscillatable beam and a reciprocable rod for operation thereby; a control comprising a hanger frame having arcuate rails, a carriage disposed between said rails having an axle with rollers journaled thereon and riding on said rails, and links pivotally secured to said beam and engaging said axle for keeping the latter in alignment.

3. In combination with an oscillatable beam and a reciprocable rod for operation thereby; a control comprising a hanger frame having arcuate rails of channel form so as to retain lubricant, and a carriage disposed between said rails having an axle with rollers journaled thereon and riding in the channels of said rails.

4. In combination with an oscillatable beam and a reciprocable rod for operation thereby; a control comprising a way supported by said beam, a carriage having wheels riding in said way, said rod being rotatably secured to said carriage, said way being of such shape that said wheels may roll thereover, and pawl and ratchet means for intermittently rotating said rod.

5. In combination with an oscillatable beam and a reciprocable rod for operation thereby; a control comprising a hanger

frame secured to said rod, a rail on said frame, a carriage having rollers riding on said rail, said rail being of such shape that the low part thereof is always in a straight line with said rod, means provided with a ratchet wheel to rotatably mount said rod in said carriage, a pawl engaged with said ratchet wheel and having an arm disposed to be abutted at one end of the travel of said carriage whereby to swing the latter, and spring means resisting the abutting movement.

6. In combination with an oscillatable beam and a reciprocable rod for operation thereby; a control comprising a way, a carriage riding in said way, said way being curved and dipping downwardly so that the low part thereof is in all working positions of said beam in a straight line with said rod, said rod being slidably mounted in said carriage and provided with means to limit its downward movement.

7. In combination with an oscillatable beam and a reciprocable rod for operation thereby; a control comprising a hanger frame secured to said rod, a rail on said frame, a carriage having rollers riding on said rail, said rail being curved and dipping downwardly so that the low part thereof is in all working positions of said beam in a straight line with said rod, said carriage being provided with an aperture through which said rod slidably extends, and a head on the upper end of said rod for limiting its downward movement in said carriage.

8. In combination with an oscillatable beam and a reciprocable rod for operation thereby; a control comprising a hanger frame secured to said rod, rails on said frame, a carriage having rollers riding on said rails, said rails being curved and dipping downwardly so that the corresponding low parts thereof are in all working positions of said beam in a straight line with said rod, a ratchet wheel slidably journaled in said carriage and having an opening at the center thereof, said rod being mounted in said opening so that it may slide longitudinally and is held against rotation therein, and a pawl mounted on said carriage and having a projecting operating arm adapted to be abutted at the end of the travel of said carriage.

In witness that we claim the foregoing I have hereunto subscribed my name this 17th day of April, 1925.

JOHN GRANT.

In witness that we claim the foregoing I have hereunto subscribed my name this 21st day of April, 1925.

STEWART L. CAMPBELL.