P. K. WOOD.

MECHANICAL MOVEMENT FOR PUMP HEADS.

APPLICATION FILED JULY 6, 1914.

1,226,430.

Patented May 15, 1917.

3 SHEETS—SHEET 1.

Fig. 2.

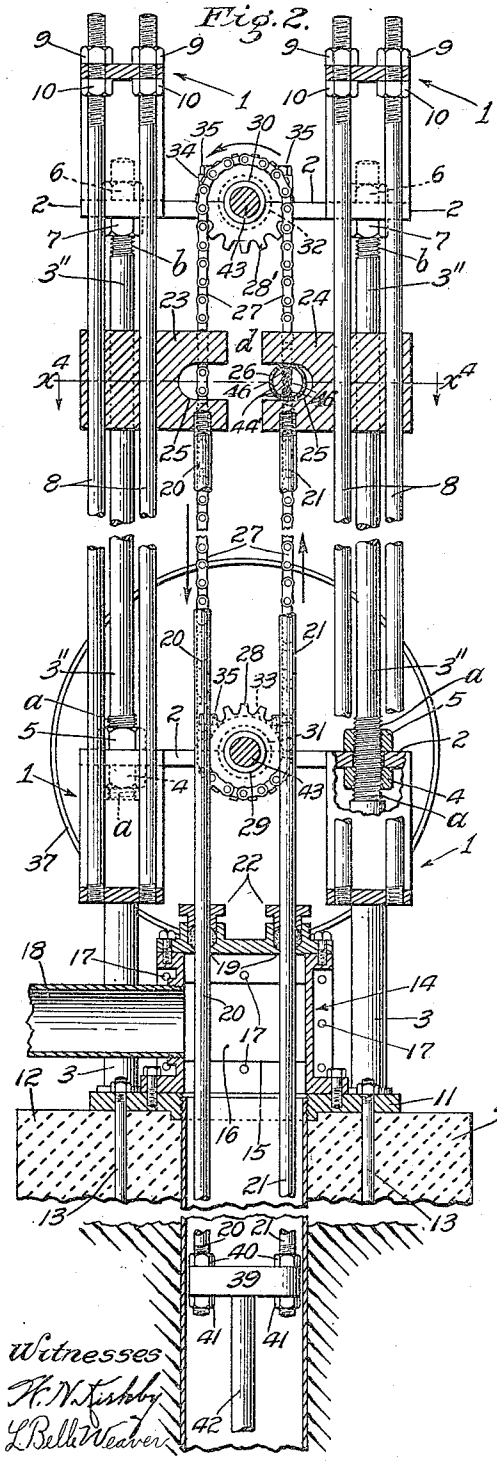


Fig. 1.

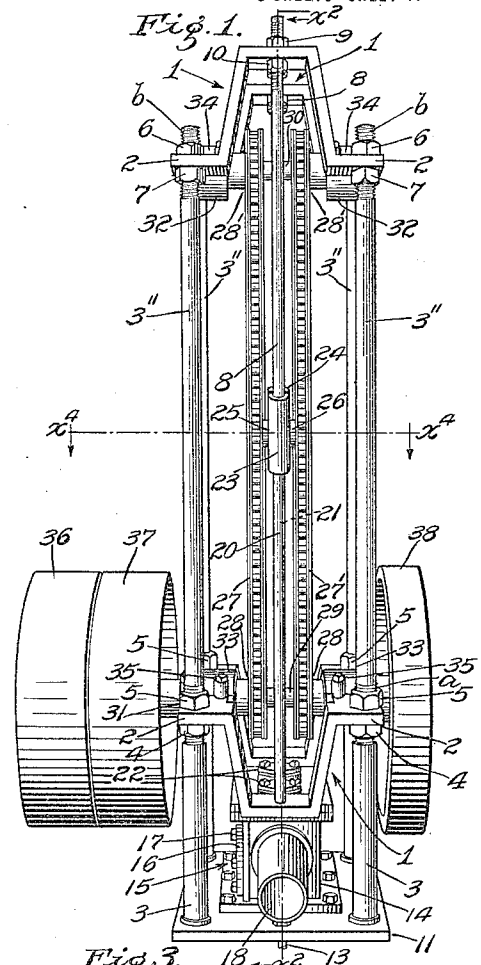
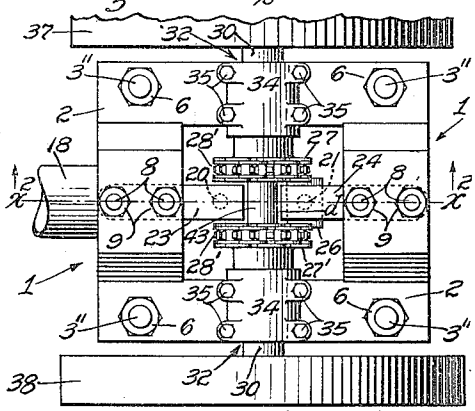


Fig. 3.



Witnesses

H. W. Kirkby

L. Bella Weaver

Inventor

Preston K. Wood

by James R. Townsend

his atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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3 SHEETS—SHEET 2.

Fig. 5.

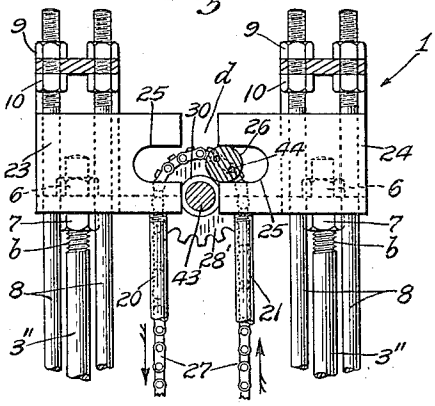


Fig. 4.

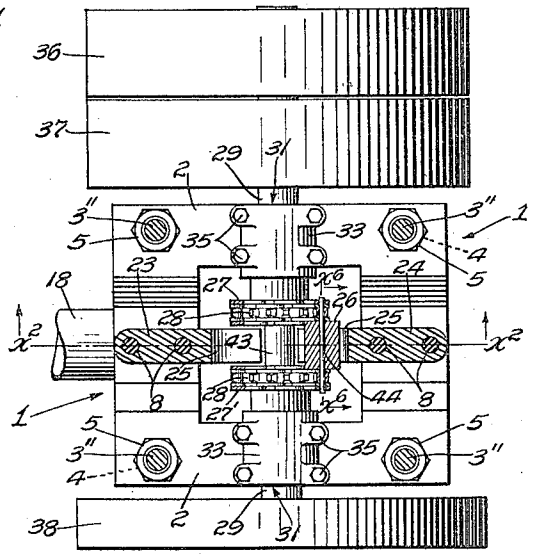


Fig. 6.

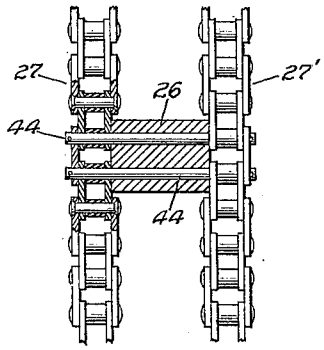


Fig. 7.

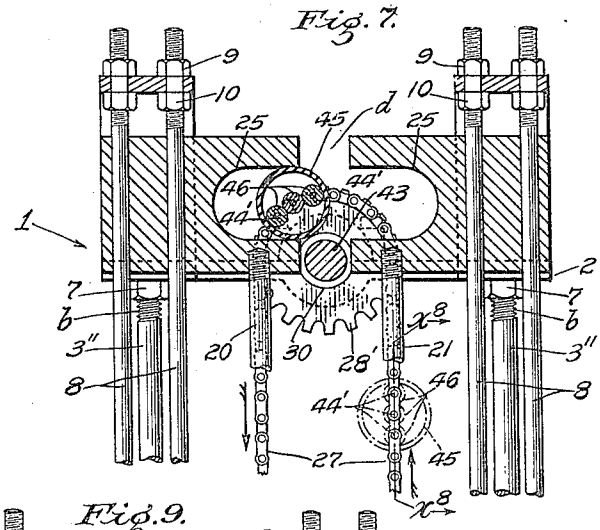


Fig. 8.

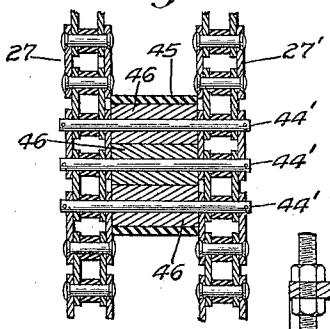
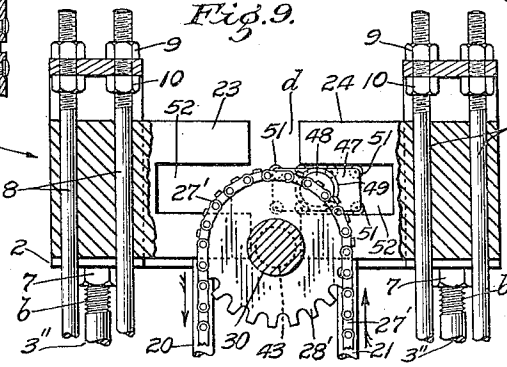


Fig. 9.



Witnesses

H. N. Kirkby

L. Belle Weaver

Inventor

Preston K. Wood

by James R. Townsend

his atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

P. K. WOOD.

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3 SHEETS—SHEET 3.

Fig. 10.

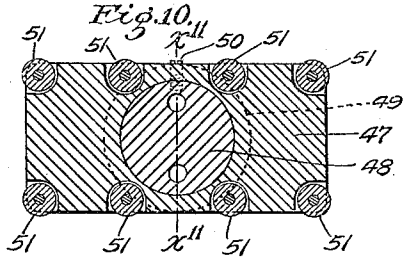


Fig. 11.

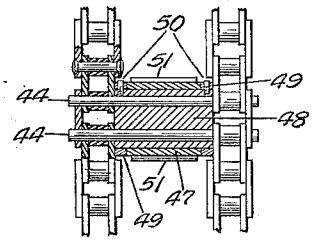


Fig. 14.

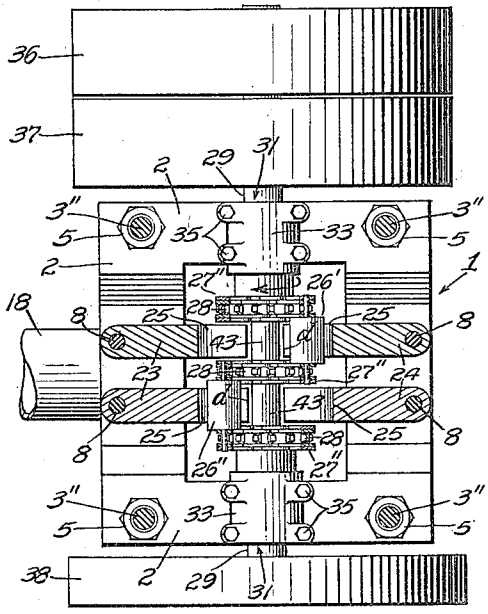
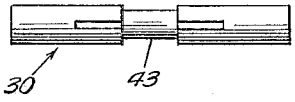


Fig. 12.



Fig. 13.



Witnesses
H. N. Kirkby
L. Belle Weaver

Inventor
Preston K. Wood
by James R. Townsend
his Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

PRESTON K. WOOD, OF LOS ANGELES, CALIFORNIA.

MECHANICAL MOVEMENT FOR PUMP-HEADS.

1,226,430. Specification of Letters Patent. Patented May 15, 1917.

Application filed July 6, 1914. Serial No. 849,288.

To all whom it may concern:

Be it known that I, PRESTON KING WOOD, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Mechanical Movement for Pump-Heads, of which the following is a specification.

This invention relates to a mechanical movement that is applicable for various uses, but more particularly relates to a pump head for applying power to the piston rod or piston rods of single acting pumps, double acting pumps and double plunger pumps, and is adapted to be variously applied in various situations to such pumps, and to be adjusted as required; and it may be applied in other machinery wherein rotary motion is changed to reciprocating motion.

In devices of this kind there are employed in combination two followers, a movable element, as the piston rod of a pump, in fixed relation to the followers, a traveler, as a bar or a slide adapted to engage said followers in alternation, endless means fixed to the traveler, to move said traveler to and fro along two parallel paths in engagement with one and the other of said followers in alternation, and means to shift the traveler from one to the other of said followers and vice versa at the ends of the paths, respectively.

In the embodiment I have constructed the endless means is in the form of two sprocket chains between which the traveler is mounted, being fixed at its ends to said chains respectively.

An object of this invention is to provide means whereby the strain on the supports for the traveler are more evenly distributed, thus to lengthen the life of the appliance.

Further objects of the invention are: strength, simplicity, cheapness, noiselessness, minimized friction, maximized transmission of power and positive operation of the piston rod or piston rods along right lines with minimized jar.

A further object is to construct the device with superior anti-friction means for driving the followers.

Other objects and advantages may appear from the subjoined detail description, and by inspection of the drawings.

The accompanying drawings illustrate the invention in various modes of its application.

Figure 1 is a perspective view of a pump head constructed in accordance with this invention and applied for the operation of a double acting piston pump. The traveler is shown in stroke position.

Fig. 2 is a mid sectional elevation on line x^2, Figs. 1, 3 and 4. Portions are broken away to contract the view and to expose parts otherwise hidden.

Fig. 3 is a fragmental plan of the pump head.

Fig. 4 is a plan section from line x^4, Figs. 1 and 2.

Fig. 5 is a fragmental sectional elevation illustrating the translation of a simpler form of the traveler from up to down stroke above the upper shaft.

Fig. 6 is an enlarged sectional detail on line x^6, Fig. 4, showing the traveler connected to the sprocket chains.

Fig. 7 is a fragmental sectional detail showing in translating position the form of traveler shown in Fig. 2 which is more particularly adapted for use in large pumping heads and for heavy machinery.

Fig. 8 is an enlarged fragmental section on line x^8, Fig. 7, the traveler being in the position indicated by dot-and-dash lines, Fig. 7.

Fig. 9 is a fragmental sectional detail of the upper end of a pump head showing another form of traveler in translating position.

Fig. 10 is a sectional detail of the form of antifriction traveler shown in Fig. 9, detached.

Fig. 11 is a section on line x^{11}, Fig. 10, showing also fragments of the sprocket chains.

Fig. 12 is a view of the driving shaft detached.

Fig. 13 is a view of the top shaft detached.

Fig. 14 is a plan section analogous to Fig. 4 showing a pump head designed for operating a double piston pump.

In carrying out this invention in the approved form, I employ a traveler carried by an endless chain that is formed of parallel endless mates driven by a rotary driver and

that operates the pump rod through reciprocating means; and said chain and driver are carried by parallel shafts adjustably mounted by means of bearing frames and columns in a pump head frame.

The bearing frames of the present pump head are duplicate castings slightly different when finished, in that holes in one for receiving supporting columns are somewhat larger than corresponding holes in the other; and each comprises two V-shaped members 1 which are united at the open ends of the V's by webs 2 that form flanges pierced to receive columns which are four in number and are arranged at the corners of a rectangular figure, thus providing on each side an open space through which water may be discharged. The columns are constructed with bases 3 of one diameter above which are the reduced portions 3″, which are provided at their lower ends with screw threaded enlargements *a*, and at their upper ends with threaded portions *b*. On the threaded enlargement *a* of each column and at a considerable distance above the lower end of the column, an adjustable shoulder 4 is formed by a nut screwed thereon. The bearing frames are arranged with the open ends of their V's toward each other, and the reduced portions 3″ of the columns are inserted through the flanges of both frames, which are adjustably held in place by nuts 4, 5, at the enlargement *a*, and nuts 6, 7, at the threaded tops *b*.

Four guide rods 8, two on each side, are screwed into the bottoms of the lower V's and are extended up through the bottoms of the top V's and are there secured in place by set nuts 9, 10.

The adjustable frame thus formed is supported by a suitable base as a plate 11 that may be anchored to a concrete bed 12 by means of anchor bolts 13 and into which plate the lower portions of the columns 3 are screwed.

The base plate 11 is provided with a discharge box 14, one side of which is provided with a hand-hole 15 covered by a plate 16 secured thereto by cap screws 17, said discharge box communicating with the outlet pipe 18. The top of the discharge box is provided with two orifices 19, through which the reciprocating pump rods 20 and 21 extend, the joints being closed by stuffing boxes 22. The reciprocating rods are screwed into and thus fixed to two independent bearing blocks 23, 24, that slide upon the guide rods 8 and extend therefrom toward each other, being spaced apart at their inner ends to form a way *d* and provided with recesses 25 to receive the traveler as 45, 47 or 26 which is mounted in any suitable manner on adjacent sides of endless mates 27, 27′ that form sprocket chains which constitute an endless driver and are arranged side by side around sprocket wheels 28, 28′, arranged in pairs at bottom and top of the frame of the pump head; being carried by the lower and upper shafts 29, 30 that are supported in bearings 31, 32 in the webs 2 of the bearing frames, and are secured in place by the caps 33, 34 for said boxes fixed in place by cap screws 35. The driving shaft 29 is preferably provided with loose and fast pulleys 36, 37 arranged on one side of the wheel and a fly wheel 38 arranged on the other side of the wheel.

The shafts 29 and 30 may be any desired distance apart, the bearing-blocks 23 and 24 being independent of each other and completely separated by the way *d*, so that the traveler 26 may pass around both of said shafts. Furthermore the bearing blocks 23 and 24 are self-contained and do not lean upon each other, being well mounted to slide in regular paths without binding.

The reciprocating rods 20 and 21 may be connected together and with the valves or other water lifting element or elements of the pump in any suitable manner and in the arrangement shown they are fixed to a common cross-bar 39 by the nuts 40, 41, and said cross-bar is in turn fixed to the piston rod 42 which may be the piston rod of a single acting pump or of a double acting pump.

The construction is practically the same for both singe acting and double acting pumps.

The shafts 29 and 30 are provided between their sprocket wheels with reduced portions 43 to allow the ends of the followers to be as close together as possible, it being understood that the power applied from shaft 29 is alternately exerted upon the traveler 26 through the upward traveling links of the sprocket chains 27, 27′ which bear half the load, and through the downward traveling side of the sprocket chains which bear the other half of the load.

In practical operation as the sprocket chains 27, 27′ are driven, the traveler travels under and over the shafts 29, 30 alternately and in such travel through the transverse planes of the shafts, shifts from the recess 25 of one slide 23 to the recess of the other slide 24 and vice versa, such recesses always being held in alinement with each other by their respective reciprocating rods 20, 21 and the cross-head 39. The traveler 26 is of greater width than the space between the slides 23, 24, so that it will bridge the space *d* between said slides as it shifts from one to the other. This traversing transversely from one to the other slide occurs below the shaft 29 and above the shaft 30 at substantially the instant in which the piston rod 42 is stationary between the down and up strokes, and vice versa.

The adjusting nuts 6, 7 on the columns enable the attendant to adjust the end frames a greater or less distance apart in order to take up any undesirable slack which may occur in the sprocket chains 27, 27'.

Said sprocket chains 27, 27' may be of any stock construction and in the form shown in Figs. 1 to 6 one of the inner plates of two opposite links of the chains 27 and 27' are removed and the traveler 26 secured in place therebetween by pins 44 which are of sufficient length to pass through the links and traveler, see Fig. 6.

From the foregoing it is seen that when the sprocket wheel 28 is turned the rotary form of motion of said wheel is translated into a reciprocating motion having a cyclic rate greater than the cyclic rate of said wheel by the chains 27, 27' and traveler 26; and also that the sprocket wheel 28 and cross-head 23, 24 constitute elements having different forms of motion, and that the chains 27, 27' and traveler 26 constitute means operable by one of said elements moving at one cyclic rate to move the other element at a different cyclic rate from said first element and at the same rate of speed, the cyclic rate of the wheel 28 being the number of revolutions per unit of time and the cyclic rate of the cross-head being the numbers of up-and-down strokes in said unit of time.

An antifriction form of traveler suitable for large pumping heads is shown in Figs. 7 and 8 in which a hollow traveler 45 is carried upon three rollers 46 mounted upon pins 44' which pass through the links and the rollers. By this construction the two end rollers roll around the intermediate one and around the inner cylindrical wall of the driver as the rollers are carried around the sprocket wheels, thus permitting the traveler to remain non-rotative when in contact with the recesses 25 upon crossing over below and above the shafts 29 and 30 respectively.

Another form of traveler is illustrated in Figs. 9 to 11 in which a rectangular block 47 may be journaled between the chains and upon the member 48, which member corresponds to the form of cylindrical traveler shown in Figs. 1 to 6. Set collars 49 are positioned upon the member 48 at each side of the block by set screws 50 seating in said member 48. At intervals along the top and bottom of the block 47, rollers 51 may be provided to roll upon the top and bottom of the angular recesses 52 as the block crosses over from one to the other of the crosshead section.

In practical operation the piston rod is forced down as well as up and great evenness of action is arrived at with consequent diminished strain.

Where a double plunger pump is employed, preferably three sprocket chains 27'' are provided to operate a pair of travelers 26', 26'' and their corresponding slides (see Fig. 14) the sprocket wheels for the chains being all mounted upon shafts corresponding to the driving shaft 29 and the top shaft 30 and one traveler is arranged to travel up and consequently lifts its slide at the same time that the other traveler is traveling down and forcing down its slide.

It is understood that the pair of sprocket chains is used simply as an expedient in order to hold the traveler 26 in true relation and that said pair of sprocket chains operate practically as a single sprocket chain might act if the traveler were appropriately connected thereto. In such case the travelers are so constructed that they do not interfere with the sprocket wheel or the shaft as they pass to their upper and lower limits of motion.

I claim:

1. The combination with two fixed parallel guides and two parallel shafts transversely arranged between said guides, and widely spaced apart, of a bearing-block slidingly mounted on one guide, a second bearing-block slidingly mounted on the other guide, two sprocket chains and their sprockets connecting said shafts, a traveler connecting said sprocket chains and alternately engaging said bearing-blocks to carry the bearing-blocks to and fro past both of said shafts, pump mechanism connected to said bearing blocks, and means for driving one of said shafts.

2. The combination with two shafts; sprocket wheels on the shafts; chains trained around the sprocket wheel and constructed with links; and followers guided along said trains and provided with recesses; of a hollow traveler between the chains, three rollers upon which the hollow traveler is carried, pins upon which the rollers are mounted; said pins passing through corresponding adjacent links of the chain and through the roller, whereby the two end rollers roll around the intermediate one and around the inner cylindrical wall of the driver as the rollers are carried around the sprocket wheel, thus permitting the traveler to remain non-rotative when in contact with the recesses upon crossing over below and above the shafts respectively.

3. In a mechanical movement for pump heads, an upper pair of V-shaped members, flanges connecting the upper pair of members together, a lower pair of V-shaped members, flanges connecting the lower pair of members together, columns connecting the upper and lower members together, the open ends of the V's being toward each other, a shaft mounted horizontally between the upper ends of the columns, a second shaft

mounted between the lower ends of the columns parallel with the first shaft, guides connecting the apexes of the V's on opposite sides of said shafts, two sprocket chains and their sprockets connecting said shafts, bearing-blocks slidingly mounted on the guides, a traveler connecting said sprocket chains and alternately engaging said bearing blocks, a pump mechanism connected to said bearing-blocks, and means for driving one of said shafts.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 27th day of June, 1914.

PRESTON K. WOOD.

In presence of—
JAMES R. TOWNSEND,
GEORGE H. HILES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."