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P. A. MYERS

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2 Sheets-Sheet 1

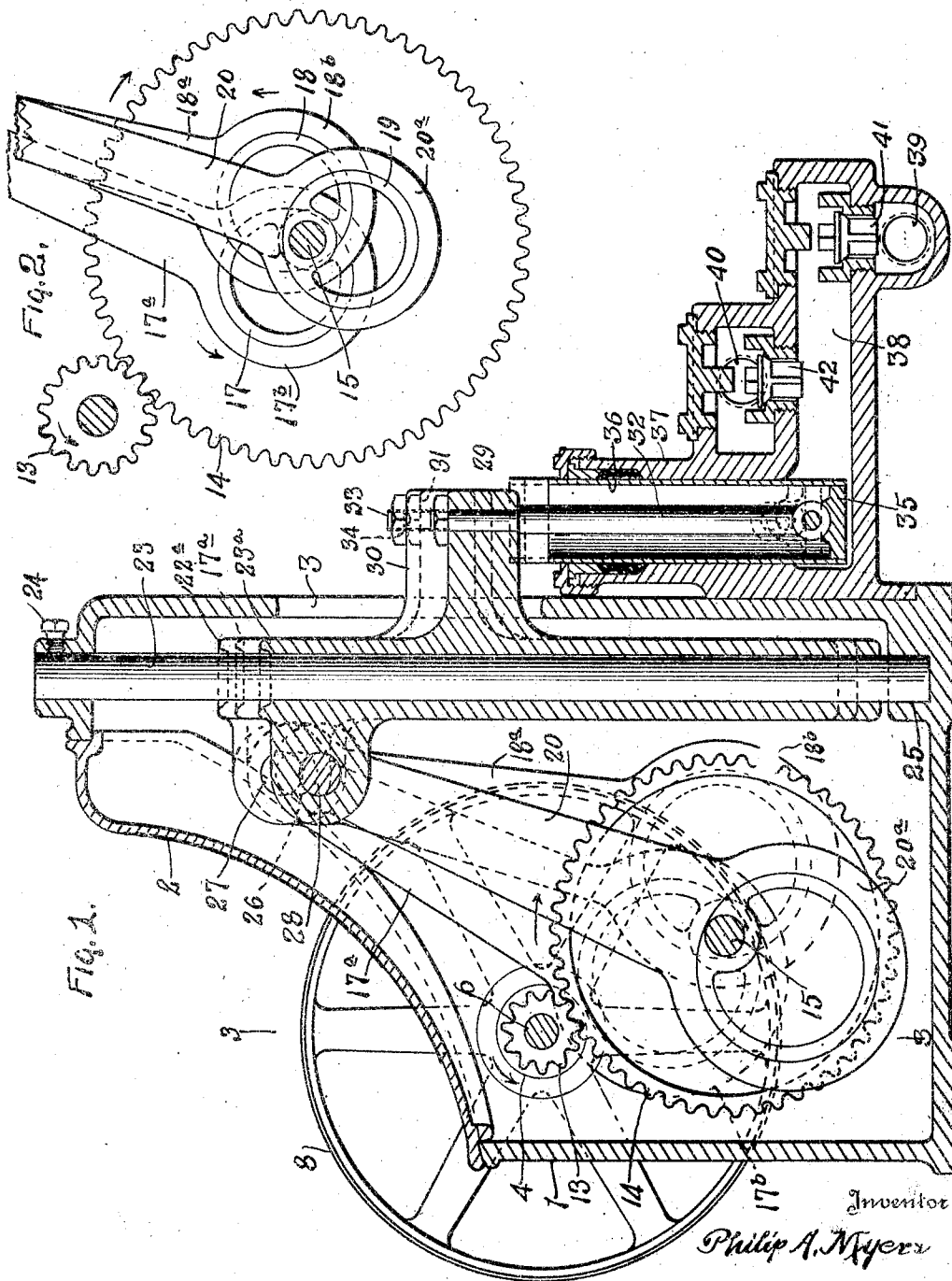


Fig. 1.

Fig. 2.

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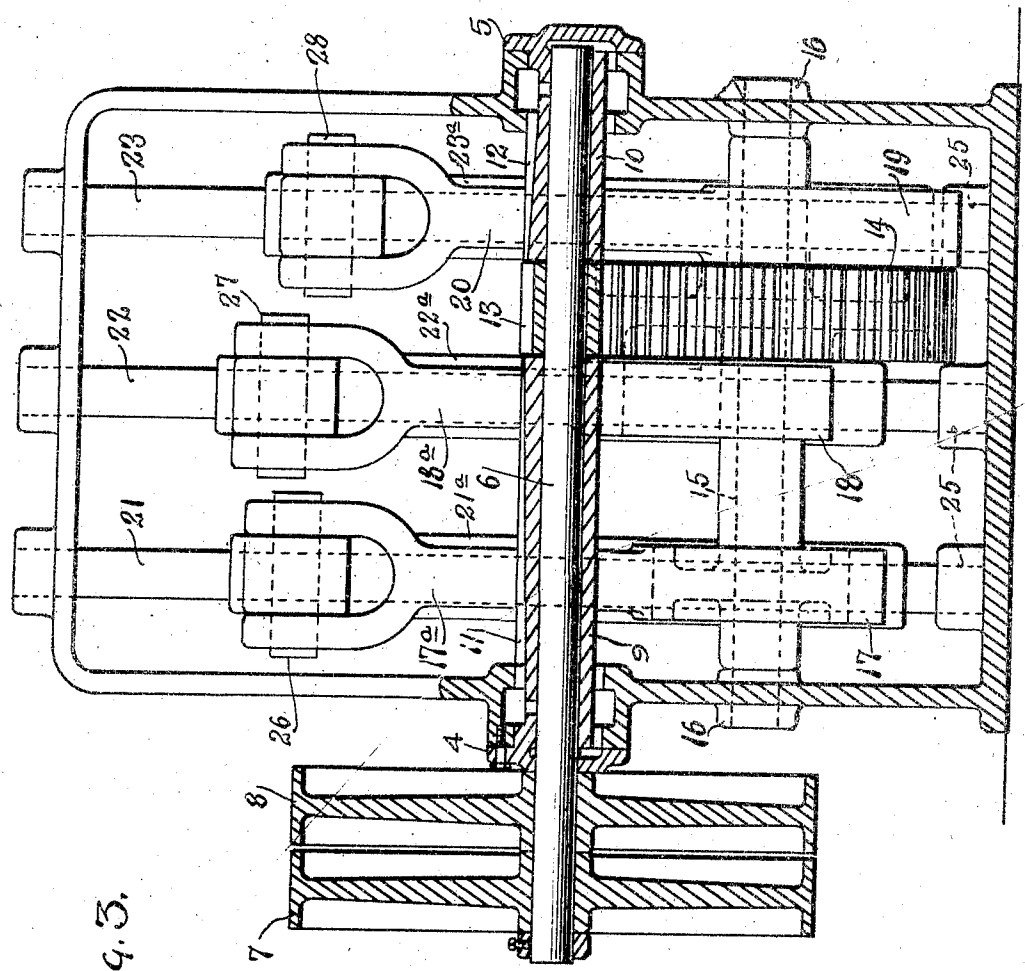


Fig. 3.

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UNITED STATES PATENT OFFICE.

PHILIP A. MYERS, OF ASHLAND, OHIO, ASSIGNOR TO THE F. E. MYERS AND BROTHER COMPANY, OF ASHLAND, OHIO, A CORPORATION OF OHIO.

PUMP.

Application filed February 23, 1923. Serial No. 620,807.

To all whom it may concern:

Be it known that I, PHILIP A. MYERS, a citizen of the United States, residing at Ashland, in the county of Ashland and State of Ohio, have invented certain new and useful Improvements in Pumps, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in pumps and more particularly to a multiple pump.

The invention consists, essentially, of a power head comprising a casing adapted to contain a multiplex power mechanism and a quantity of lubricant, combined with a multiple pump comprising cylinders with their pistons and piston rods, a connection between each piston rod and one branch of the power mechanism and of a water chamber into and out of which the water is drawn and discharged, respectively, by the pumps.

The invention further consists in so relating and positioning the multiplex power devices with the multiple pumps as that when one pump is about completing its discharge stroke another pump will be still undergoing its discharge movement and still another pump undergoing its suction movement, so that water is always being drawn into and always being discharged from the water chamber, thus making a perfectly uniform and uninterrupted flow of water, with the result that great quantities are pumped in any given space of time, there being no intervals when the water is not flowing.

And the invention further consists in so relating and combining this power mechanism, so comprised of the casing and multiplex power devices with the pump mechanism comprised of the water chamber and the multiple cylinders, pistons and piston rods, as that both the power mechanism and the pumping mechanism will be essentially within the same horizontal level, so that the application of the power to the pumps will be at points low down and near to the pumps, as distinguished from the arrangement in the use of the usual pump jack or pump head in which the power of the pump jack is delivered to the pump piston rod at a point high up above the source of power and the location of the cylinder and piston, which high up position tends to rock the structure laterally, to loosen up the parts and to interfere with smooth operation.

And again, by reason of this low down position of the power mechanism as compared with the location of the pumps I am enabled to carry into effect my self oiling provision which requires that the casing which contains the oil should be low down or near to the floor or other support.

Again, this apparatus is particularly designed for use in situations where the water supply is say twenty-five feet or less in distance from the location of the pumps but where the point of use of the water is very high above the location of the pumps; as for instance where the water is pumped from a shallow well under a hotel to be used at points high up in the upper stories of the building or to be delivered in a high tank. And likewise for use in mines under similar conditions.

These several objects are carried into practical effect by the multiplex power mechanism and multiple pumps and their relative positions, as shown in the accompanying drawings, which are illustrative of my preferred form of construction.

In the accompanying drawings:

Fig. 1 is a vertical, sectional view of my multiplex power mechanism and multiple pumps, the section going through the center of one of the pumps;

Fig. 2 is a diagrammatic view illustrating such position of the power devices as will cause one pump to be completing its discharge of water, another pump to be in the full action of discharging and the third pump in the full action of drawing up water; and

Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 1 and looking in the direction of the arrow.

The numeral 1 designates a casing preferably made of cast iron and adapted to contain both a quantity of lubricant and the power operating mechanism which is to be lubricated and is to perform the function of operating the pump pistons. This casing has a removable cover 2 which enables the ready delivery of lubricant into the casing and the ready placing of the operating mechanism in the casing for purposes of being assembled.

It also has a vertical slot 3 for a purpose presently to appear.

In suitable bearings such as indicated at 4 and 5 in Fig. 3, which bearings are carried

by the casing, I mount a power driven shaft 6 having a loose pulley 7 and a fixed pulley 8 on which a power belt is placed, the belt being shiftable from the loose to the tight and from the tight to the loose pulley. This shaft extends across the casing and is inclosed in an extended sleeve made of sections 9 and 10 and having along its upper surface inclined grooves 11 and 12 which catch the droppings of lubricant dropping from the mechanism above and convey this lubricant into the bearings. On the shaft 6 is secured a pinion 13 which meshes with and rotates a driven gear wheel 14. This wheel 14 is mounted on a shaft 15, mounted in boxes 16, carried by the walls of the casing. This shaft is rotatable in these boxes or may be otherwise mounted if desired. As illustrated, the shaft is rotatable and the gear 14 is fixed to it so that when the gear itself is rotated it carries the shaft. On this shaft are mounted, fixedly, three eccentrics designated 17, 18, 19, each eccentric, in its order, being stepped in advance of the other a distance substantially equal to one-third of the circumference, so that the working strokes of these eccentrics will follow one in succession with the other in a manner to produce the relative movements of the pump pistons to be presently set forth.

Each eccentric carries and operates a pitman, the eccentric 17, a pitman 17^a, which has a ring-like portion 17^b which fits about the eccentric 17; the eccentric 18, a pitman 18^a, having a ring-like portion 18^b; and the eccentric 19, a pitman 20 also having a ring-like portion 20^a which fits about the eccentric 19.

Thus when the driving pinion 13 rotates the driven gear 14 these eccentrics and their respective pitmen are also operated. The direction of rotation of the pinion is shown by the arrow in Fig. 1 while the direction of rotation of the gear 14 is in the opposite direction as shown also by an arrow in Fig. 1. The direction of rotation of the eccentrics is the same as that of the gear wheel 14.

In the casing there is also secured suitable guides which in the form illustrated consists of shafts or rods 21, 22, and 23 secured to the casing at their upper ends by set screws 24 and at their lower ends in sockets 25. On these guides are mounted slides 21^a, 22^a, and 23^a, respectively. These slides are adapted to travel up and down on the guides when they are actuated by the pitmen. The pitman 17^a operates the slide 21^a to which it is actuated at its upper bifurcated end by a pin 26; the slide 22^a is operated by the pitman 18^a whose upper bifurcated end is connected to the slide by a pin 27, and the slide 23^a is operated by the pitman 20 whose upper bifurcated end is connected to the slide by a pin 28.

As best seen from Fig. 1, the slide 23^a has

a projecting arm 29. The slide 22^a has a projecting arm 30, and the slide 21^a has a projecting arm 31. All of these arms extend through the slot 3 in the casing. Each arm is connected to a separate piston rod—the arm 29 to the piston rod 32—the arm 30 to the piston rod 33—and the arm 31 to the piston rod 34. Thus when the slides are operated the piston rods also are operated.

Each piston rod has a piston, such as piston 35, on the rod 32 and each piston is fitted to a cylinder, such as cylinder 36 in which the piston 35 operates.

These cylinders, of which there are three, are mounted in a pump head or housing generally designated 37. It is in the form of a hollow casting and contains a water chamber 38, an inlet port 39, and a discharge port 40. A check-valve 41, which closes by gravity, is seated between the inlet port and the water chamber and opens toward the chamber to admit water into the chamber from the inlet port. Another check-valve 42, which seats by gravity, is mounted between the water chamber and the outlet port 40 and unseats toward the port 40 to permit the water to pass from the chamber 38 into and out of the port 40.

From the foregoing detail description it will be seen and understood that my invention comprehends a power head comprised of a casing and a multiplex power mechanism, and pump mechanism comprised of multiple pumps, and that this union of the multiplex power devices and multiple pumps produces a very effective pumping apparatus by which water is elevated from the source of supply and forced to the place of use or collection in a continuous and uninterrupted stream.

It will be also noted that my invention includes a connection between each branch of the power mechanism—an eccentric, its pitman and the slide—and a piston working in a cooperating cylinder, together with a pump head with its water chamber inlet and outlet ports and valves, which latter several elements are common to the several cylinders and pistons.

It will also be understood that my invention comprises the feature of so positioning the branches of the multiplex power devices with relation to the multiple pumps as that when one pump is completing its discharge stroke, another pump is in the midst of its pumping stroke, while yet another pump is then undergoing its suction or water lifting stroke, which results in maintaining a continuous inflow of water into the water chamber as well as a continuous outflow of water therefrom.

The diagrammatic view shown in Fig. 2 illustrates these relative movements of the multiple pump pistons. In the diagram, the lower eccentric has carried its pump piston

fully through the down-stroke which has caused a discharge of water; the left-hand eccentric in the upper position is carrying its piston on the down-stroke so as to continue the discharge of the water while the right-hand upper eccentric is still on its up-stroke and is continuing therefore to draw up a further supply of water into the water chamber 38.

Thus by my multiplex power devices and my multiple pumps I make a combination pumping apparatus in which I produce the valuable result of a continuous inflow and outflow—a continuous lifting and forcing—of water from the source of supply to the place of use or storage.

It will soon further be seen that my invention comprehends so positioning the multiplex power mechanism, with its surrounding lubricant casing, with respect to the multiple pumps as that both mechanisms are in what I may call a low-down position, both being within about the same horizontal level. This I do in contradistinction from the prevailing plan of having the power mechanism or power jack extended way above the pump piston and cylinder with the resulting tendency of causing the operating force to produce side motions which rock the structure from side to side. It is also to be observed that by reason of this general sameness of horizontal position of the power mechanism and the pump mechanism I am enabled to carry into effect my self-oiling arrangement which requires that the casing which contains the oil should be low-down or near the place of support. And another advantage of the low-down location of the power head is that the belt which delivers the power to the driving pulley of the head is prevented from the tendency to pull laterally on the power head and tip it over or loosen it from its fastenings.

And finally I would add that this apparatus is particularly designed for use in situations where the water supply is say twenty-five feet or less in distance from the location of the pumps, but where the point of use or storage of the water is very high above the location of the pumps. As for instance, in pumping water from a shallow well under a hotel to high points of use or storage in the upper stories or for the delivery of water to a high tank, and likewise as to situations in mines.

From what is stated above it will also be observed that the up or suction stroke of the pistons and piston rods is effected when the eccentrics are moving generally upward and the pitmen are at their greatest inclination, while on the power or downward stroke of the pistons and their rods, when the water is being forced to high elevations and the load is heavy, the eccentrics are generally

moving downward and the pitmen are in line with the line of movement of the slides on the guides, so that the pull of the pitmen on the slides is then more nearly direct.

The apparatus which is the subject of this specification has been, and now being made, the subject of commercial manufacture and sale on a large scale at the pump works of my assignee, and has proved to be a highly satisfactory and useful pumping appliance, so that the statements as to the mode of operation and results herein made are based upon actual performance of the apparatus.

While I have shown and described eccentrics as the means of operating the pitmen I may employ, within the contemplation of my invention, other means for this purpose.

Again, it will be noted that there are times when two pistons are traveling upward and drawing water into the water chamber; and that there are other times when two pistons are moving downward and discharging water from said chamber; and that in the first of these situations the third piston is then on the down-stroke discharging water, and in the second of these conditions the third piston is on the up-stroke drawing up water.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. The combination with a power head comprising a casing for a lubricant and multiplex power devices mounted and operable in the casing, of pumping mechanism comprising a pump head and multiple pumps, pistons with connections between the multiple pump pistons and the multiplex power devices to cause the latter to reciprocate the former so that when one piston is completing its discharge stroke, another piston is undergoing its discharge movement and still another is undergoing its suction movement.

2. The combination with a power head comprising a casing adapted to contain a lubricant and multiplex power devices consisting of gearing and pitmen operated by the gearing through intermediate devices, of a pump head, having multiple cylinders and their pistons and piston rods, and connections between the pistons and the pitmen so that when one piston is completing its discharge stroke, another piston is undergoing its discharge movement, and still another is undergoing its suction movement.

3. The combination with a power head comprising a casing adapted to contain a lubricant, a driving shaft, a driven gear, eccentrics operated thereby stepped one in advance of the other, a pitman operated by each eccentric, and guides and slides for each pitmen, of a pump head, multiple cylinders and a piston and piston rod for each cylinder and a connection between each piston rod and a slide.

4. The combination with a power head comprising a casing adapted to contain a lubricant and multiplex power devices mounted and operated therein, of a pump head having multiple cylinders, each having a piston and piston rod and connections between each piston rod and each operating device, all of the power head mechanism and the multiple pump devices being located within substantially the same horizontal level and adapted to occupy a low-down position on their support.

5. The combination with a power head comprising a casing adapted to contain a lubricant, a driving shaft with a pinion, a driven gear, multiplex eccentrics connected with the gear and stepped one in advance of the other, a pitman operated by each eccentric, a guide and a slide for each pitman, each slide having a projecting arm, of a pump head secured to the casing having a water chamber, and inlet and outlet ports, said pump head having a check-valve for each port, and multiple cylinders each having a piston and piston rod, each rod connected to a slide arm, the eccentrics being adapted to cause the completing of the discharge stroke of one piston, while another piston is undergoing its discharge movement, and still another is undergoing its suction movement.

6. The combination with a power head comprising a casing adapted to contain a lubricant, a driving shaft with a pinion, a

driven gear, multiple eccentrics rotatable by the gear, each eccentric set in advance of the other, a pitman operated by each eccentric, a guide and a slide for each pitman, of a pump head having a water chamber, inlet and outlet ports, and multiple cylinders, to all of which the water chamber and ports are in common, a piston and piston rod for each cylinder, each rod connected to one of the slides; the eccentrics and pitmen on their up-stroke being adapted to operate the pistons on the suction stroke, and on their down-stroke to operate the pistons on the discharge stroke, and further adapted to cause the completing of the discharge stroke of one piston, while another piston is undergoing its discharge movement, and still another is undergoing its suction movement.

7. The combination with a power head comprising a support and multiple power devices mounted on said support, of pumping mechanism comprising a pump head and multiple pumps having pistons, with connections between the multiple pump pistons and the multiplex power devices to cause the latter to reciprocate the former so that when one piston is completing its discharge stroke, another piston is undergoing its discharge movement, and still another is undergoing its suction movement.

In testimony whereof, I affix my signature.

PHILIP A. MYERS.