B. F. MOHR.

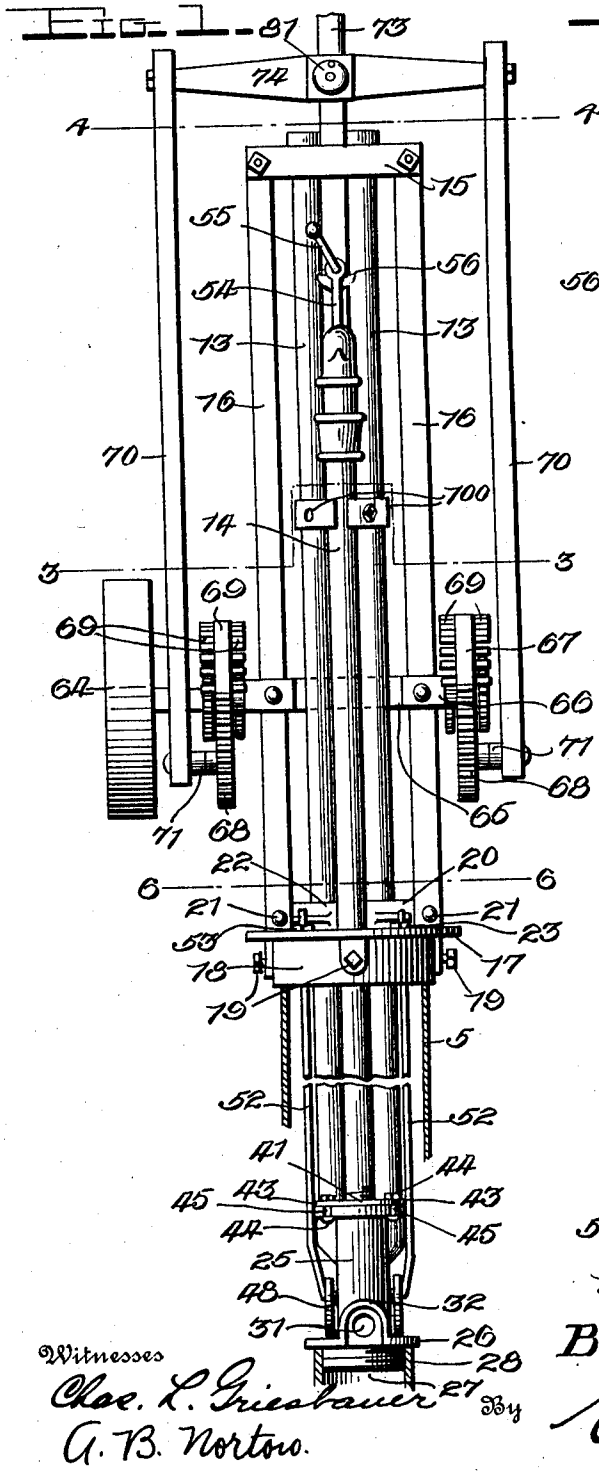
PUMP.

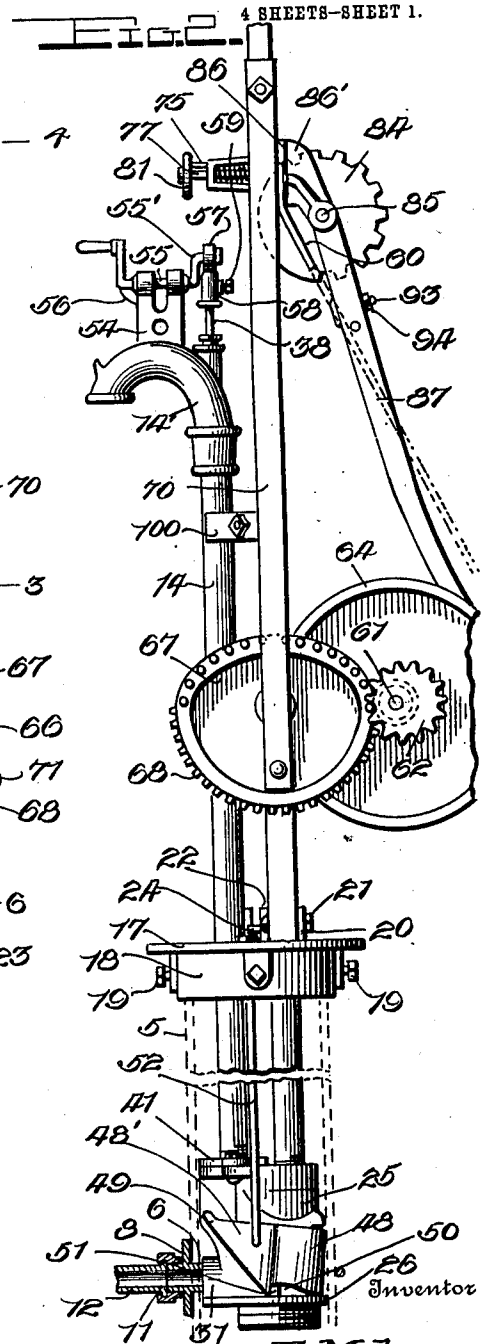
APPLICATION FILED DEC. 6, 1911.

1,031,362.

Patented July 2, 1912.

4 SHEETS—SHEET 1.





Witnesses

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Attorney

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4 SHEETS—SHEET 2.

Fig. 3.

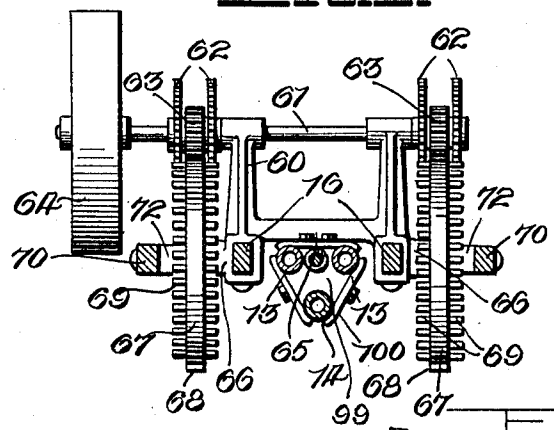


Fig. 4.

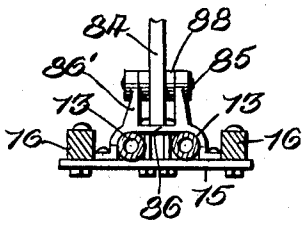


Fig. 7.

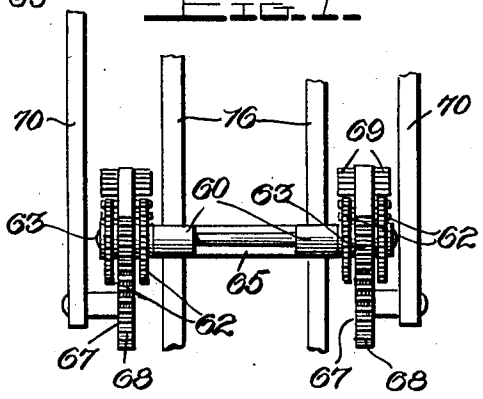


Fig. 6.

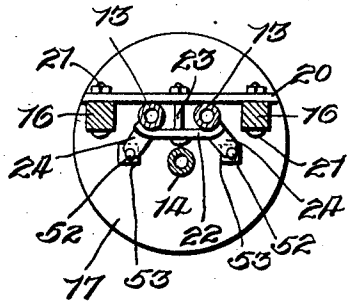
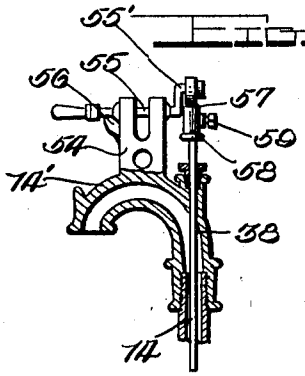


Fig. 5.



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4 SHEETS—SHEET 3.

Fig. 8.

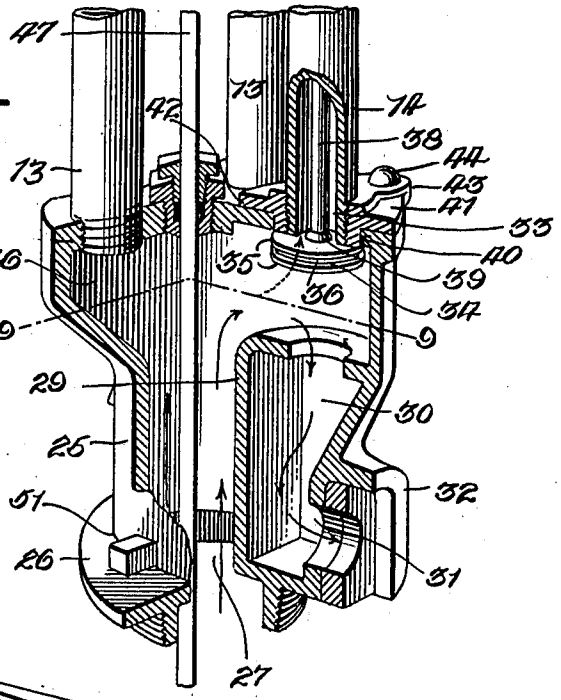


Fig. 10.

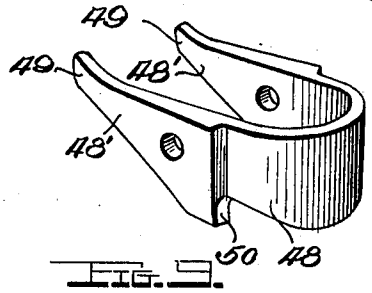


Fig. 9.

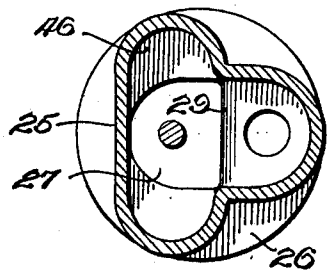
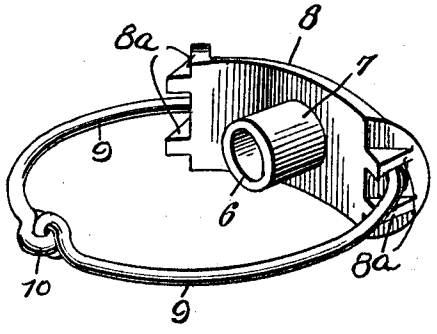


Fig. 15.



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4 SHEETS—SHEET 4.

Fig. 11.

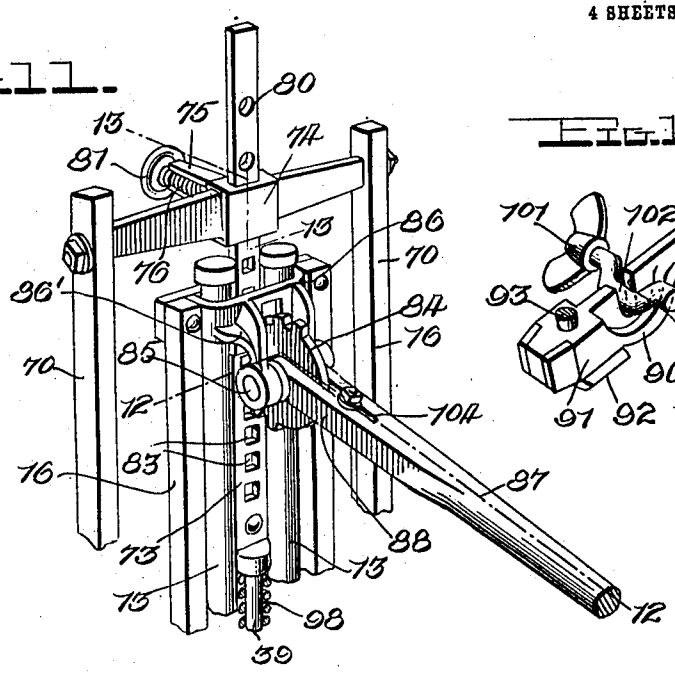


Fig. 14.

Fig. 12.

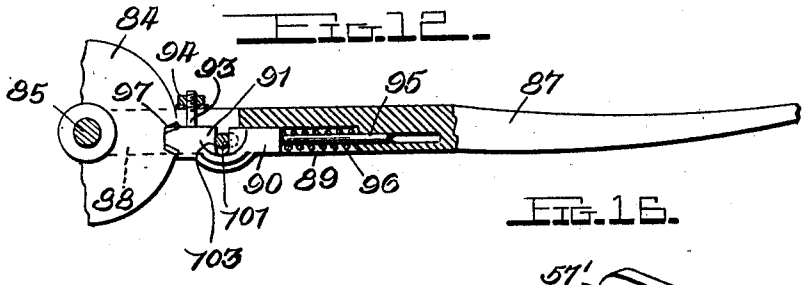


Fig. 16.

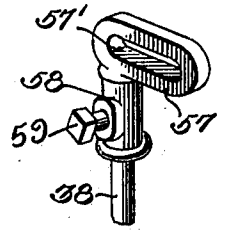
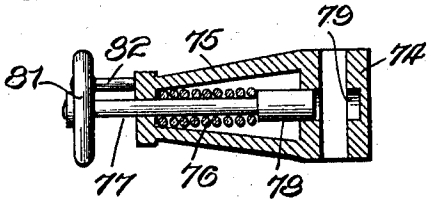


Fig. 13.



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UNITED STATES PATENT OFFICE.

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PUMP.

1,031,362. Specification of Letters Patent. Patented July 2, 1912.

Application filed December 6, 1911. Serial No. 664,239.

To all whom it may concern:

Be it known that I, BENJAMIN F. MOHR, a citizen of the United States, residing at Mifflinburg, in the county of Union and State of Pennsylvania, have invented certain new and useful Improvements in Pumps, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to certain new and useful improvements in pumps and has for its object to provide a very efficient and comparatively simple pump construction of that character commonly employed in drawing water from wells.

Another object of the invention resides in the provision of a combined hand and power operated pump mechanism, a more specific object residing in the provision of means whereby the down stroke of the pump rod may be accelerated without necessitating an increased consumption of power.

Another object of the invention is to provide improved means for easily and quickly converting the pump from a power actuated mechanism into a manually operable pump.

A still further object of the invention is to provide a three-way valve of improved construction and means for properly disposing the same in the well casing and rigidly maintaining the same in position whereby an absolutely water-tight joint is secured between the valve and the lateral discharge port thereof.

Yet another object of the invention is to provide a three-way valve for pumps including a movable valve member whereby the flow of the water may be controlled and directed, and improved means for actuating said valve member.

With the above and other objects in view, the invention consists of the novel features of construction, combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved pump showing the same arranged in combination with the well casing, said casing being shown in section; Fig. 2 is an elevation of the pump mechanism similarly arranged and looking at right angles to Fig. 1; Fig. 3 is a section taken on the line 3—3 of Fig. 1; Fig. 4 is a section taken on the line 4—4 of Fig. 1; Fig. 5 is a detail vertical section of the upper end of the water discharge pipe or tube showing the manner of mounting the valve rod and the means for actuating the same; Fig. 6 is a detail horizontal section taken on the line 6—6 of Fig. 1; Fig. 7 is a detail rear elevation of the gearing; Fig. 8 is a sectional perspective view through the three-way valve; Fig. 9 is a horizontal section taken on the line 9—9 of Fig. 8; Fig. 10 is a detail perspective view of the movable clamping yoke; Fig. 11 is a perspective view of the upper portion of the power reciprocated yoke frame, the stationary supporting frame for the gearing and the means for manually actuating the pump rod; Fig. 12 is a section taken on the line 12—12 of Fig. 11; Fig. 13 is a section taken on the line 13—13 of Fig. 12; Fig. 14 is a detail perspective view of the handle locking member; Fig. 15 is a similar view of the connecting nipple. Fig. 16 is a detail perspective view of the slotted link arranged upon the upper end of the valve rod.

Referring in detail to the drawings 5 designates the well casing which lines the walls of the hole which has been sunk or drilled, the upper end of said casing projecting slightly above the surface of the ground. In the installation of pumps employing a three-way valve, it has heretofore been the practice to dig a "blind" well surrounding the real well so as to facilitate the connection of the lateral fluid carrying pipe to the valve. By means of my invention I aim to eliminate this considerable amount of additional labor and to properly dispose the valve and form a fluid tight connection between the same and the lateral conducting pipe. In putting the present invention into practice, the earth is excavated on one side of the well casing and an opening drilled in the wall of said casing at the point of attachment of the lateral conducting pipe. In this opening thus provided a suitable nipple indicated generally by the numeral 6 is arranged. This nipple embodies a body plate 8 having a short tubular extension 7 formed thereon which projects through the wall of the casing and into the same. The body plate is of concavo-convex form and lies closely against the periphery of the well casing. The ends of this plate are laterally extended and are provided upon one side with the spaced webs 8ª which closely engage the casing wall. Between the webs the ends of the plate are provided with openings to receive the ends of the yoke rod sections 9,

said sections being loosely connected as indicated at 10 and surrounding the well casing whereby the nipple is retained in its proper position. The convex face of the body plate of the nipple is provided with an annular threaded flange to receive a pipe coupling indicated at 11 whereby the lateral water conducting pipe 12 may be easily and quickly connected to the nipple.

The pump proper includes a pair of air pipes 13 and the pump barrel or tube 14. The upper ends of the air pipes 13 are rigidly fixed between the cross bars 15 which connect the upper ends of the vertical supporting bars 16 on which the operating mechanism to be later described is mounted and supported. A cap 17 is provided with suitable openings to receive the pipes or tubes 13 and 14 upon which said cap is disposed at a point substantially centrally between their ends. The body of the cap is provided upon its under side with a flange or collar 18 which fits over the upper projecting end of the well casing 5. In this collar set screws 19 are threaded for binding engagement with the wall of the well casing to rigidly fix the cap thereon. Upon the upper surface of the cap 17 a horizontal bar 20 is formed, said bar having notches or recesses in its ends to receive the bolts 21 which secure the lower ends of the supporting bars 16 to said cap. This horizontal bar 20 extends upon one side of the air pipes 13 and a second bar or plate 22 is arranged upon the surface of the well cap and extends upon the opposite sides of said air tubes. Connecting bolts 23 are disposed through apertures formed in the plates 20 and 22 and extend between the air tubes 13, said bolts serving to rigidly clamp the cap upon said tubes. The ends of the plate 22 are concaved upon their inner faces to closely engage the air tubes, and it will be obvious that when the nuts are tightened on the ends of the bolts 23 the plate 22 will be drawn into close clamping engagement upon said tubes. The plate 22 is also provided upon its ends with laterally disposed lugs 24, the purpose and function of which will be more fully disclosed in the following description.

My improved three-way valve consists of the casing 25 the lower end of which has formed therein a laterally disposed flange 26. A depending threaded union flange is also formed on the bottom of the casing at the entrance to the inlet port 27 for the connection of the pump rod barrel 28 to said valve. This valve casing is formed with an interior vertical partition 29 to provide the chamber 30 into which the lateral discharge port 31 opens. At the entrance to this port the valve casing is laterally extended to form an overhanging flange 32 which is adapted to rest or seat upon the inwardly extending portion of the nipple 7 in the assemblage of the pump. The top wall of the chamber 30 is provided with the outlet opening 33 which is adapted to be closed by a movable valve member 34. While this valve member may be of various forms, I preferably employ the spaced leather disks 35 between which a metal plate 36 is arranged. The valve rod 38 extends through these disks and the plate, said rod extending through the pump barrel or discharge tube 14 as shown.

Suitable washers 39 are arranged upon the valve rod for clamping engagement with the leather disks whereby the valve member is rigidly secured upon said rod. The valve member operates between the top of the chamber 30 and the top wall of the valve casing which is also provided with an opening 40 to receive a union member 41 arranged upon the top of said casing. A packing gland or ring 42 is arranged between this member and the top of the valve casing and forms a water-tight joint between said casing and the lower end of the pump barrel or discharge tube 14. The union 41 is also provided with the laterally extending ears or lugs 43 which are apertured to receive fastening bolts 44, said bolts being received in notches or recesses 45 in the upper portion of the valve casing. The air receiving chamber 46 is provided in its top wall with threaded openings to receive the lower ends of the air pipes or tubes 13 which are adapted to contain the body of compressed air which acts upon the water drawn into the valve casing in the reciprocation of the pump rod to discharge the same. This pump rod indicated 47 extends through a suitable bushing arranged in the top wall of the valve casing between the air receiving pipes 13 and extends downwardly through the air chamber into the barrel 28.

A yoke member 48 surrounds the lower portion of the valve casing and has its parallel arms 48′ extended upon that side of the casing in which the lateral outlet port is provided. The lower edges of these arms are upwardly inclined or tapered and terminate in the angular extensions 49 which are adapted to engage one side of the casing wall 5 as the pipes or tubes 13 and 14 and the valve to which said tubes are connected are lowered into said casing. The body portion of the yoke member 48 has provided in its lower edge and at opposite points the recesses or notches 50 which are adapted to receive the lugs or shoulders 51 formed upon the exterior of the valve casing and upon the upper surface of the flange 26 thereof. To the reduced tapered arms 48′ of the yoke member the lower ends of rods 52 are loosely connected, the upper ends of said rods extending through openings in the body of the well cap or cover 17, said rods being disposed in vertical alinement with the lugs

24 formed upon the clamping plate 22. Nuts 53 are threaded upon the upper ends of these rods and are adapted to draw the same through the cover or cap 17, the lugs 24 limiting the upward movement of said nuts. It will be observed that the edge of the overhanging flange which surrounds the lateral entrance port of the valve casing is disposed in the plane of the outer edge of the base flange 26 on said casing, said flange providing a recess of substantially inverted U-shaped form in the side of the casing wall. In the arrangement of the valve and the pipes or tubes connected thereto in the well casing, the same are lowered into said casing, the valve being so disposed that the inwardly projecting portion of the nipple 7 is received in the U-shaped recess formed by the flange on the casing as above described. If however, the valve is not properly disposed so that the recess thereof will register with the nipple, the laterally extending flange 26 will engage upon the nipple and the valve is then rotated until the same is properly positioned. In this rotative movement of the valve the ends 49 of the arms 48′ of the yoke engage the wall of the casing and prevent the valve from tilting or oscillating therein. The wall of the valve casing surrounding the lateral discharge port thereof is preferably leaded so that the same will form a tight joint with the nipple 7. The operator now adjusts the nuts 53 upon the upper ends of the rods 52 to draw said rods upwardly, whereby the yoke 48 is rocked upon the flange 26 as a fulcrum for the yoke, and the intermediate portion of the yoke plate thrown upwardly or disposed at an angle with relation to the valve casing, thereby causing said yoke plate to bind tightly against the wall of the well casing and force the valve laterally in said casing whereby a perfectly tight and secure joint is formed between the same and the nipple 7.

It is of course understood that the valve 25 is first properly disposed and secured in position within the well casing before the several pipes 13 and 14 are connected thereto. In assembling the parts, after the valve has been lowered into engagement with the nipple 6, the cap or head 17 is then placed in position upon the upper end of the well casing, the ends of the rods 52 being disposed through openings in the head. The nuts 53 on said rods are then adjusted so as to move the valve laterally in the casing as above explained and obtain a water-tight connection of its outlet port with the nipple 6. The several pipes 13 and 14 are now inserted through openings in the head and threaded into the valve casing.

Upon the upper end of the barrel or tube 14 a suitable discharge spout 14′ is arranged, and said spout has integrally formed thereon a bearing 54 in which a crank shaft 55 is mounted, the rotative movement of said crank shaft being limited in each direction by the stops 56 which are formed upon the bearing. The end of the crank 55′ of said shaft is disposed in the slot 57′ of a link 57. This link is formed upon the upper end of an adjustable extension 58 of the valve rod 38, said extension carrying a set screw 59 for binding engagement with said rod whereby the link may be rigidly secured in its adjusted position. By means of this construction, it will be readily seen that the valve member 33 may be raised or lowered by simply moving the outer end of the crank shaft 55 in either direction whereby the end of the crank is moved in the slot of the link 57 and the valve rod forced downwardly or thrown upwardly through the tube or pipe 14. When the valve member is drawn upwardly to the limit of its movement, communication between the entrance port of the valve and the pipe 14 is cut off, and the water is discharged from the valve through the lateral entrance port into the conducting pipe which is connected thereto and is carried to a distant point of discharge. When the crank 55 is operated to draw the valve member 33 downwardly, communication between the entrance port and chamber 32 of the valve casing is cut off and the water is now forced upwardly into the pipe or tube 14 and discharged from the spout 14′. In this manner the flow of water may be easily and quickly changed by simply manipulating the crank shaft 55, and the water discharged directly at the pump or carried off by the lateral pipe beneath the ground surface and conducted to the house, barn or other point at which it is desired to utilize the same.

The upright frame bars 16 are braced by means of the inclined rods 60 which are fixed at their lower ends to a suitable base or sill bar. In bearings fixed to the bars 16 adjacent their lower ends, a horizontal shaft 61 is rotatably mounted and upon each end of this shaft a pair of spaced eccentric cog wheels 62 are rigidly secured. A pinion 63 is also secured on each end of the shaft between the cog wheels of each pair, the teeth of the cog wheels, however, being disposed in planes beyond the teeth of the pinions. To one end of the shaft 61 a band wheel 64 is secured to receive an endless belt or band connected to a motor or other suitable source of power. A horizontal bar 65 also connects the vertical frame bars 16 and is provided upon its ends with stud shafts 66. Each of these studshafts has rotatably mounted thereon an elliptical gear 67. A portion of the periphery of these elliptical gear wheels is provided with teeth 68 of the proper pitch to mesh with the teeth of the pinions 63 while the remaining portion of the periphery of the gear wheels are provided with oppositely disposed laterally ex-

tending teeth 69. These latter teeth extend through a portion of the long arc constituting the periphery of the gear on one edge and around one end of the gear. By forming the larger gears in this manner and providing the separate cogs and pinions for engagement therewith, the downward movement of the pump rod is accelerated without requiring any extra application of power. The pump yoke consists of the parallel vertical arms 70 which are eccentrically connected at their lower ends to the gear wheels 67 by means of the pins 71 which are mounted in tubular bearings or sleeves formed upon said gear wheels. The upper ends of these arms are connected by means of the cross bars 74, which cross bar is coupled or connected to the pump rod in the manner which will be hereinafter specifically referred to.

From the above construction it will be seen that in the rotation of the shaft 61, while the pinions 63 are in mesh with the teeth 68 of the elliptical gears 67, the upward movement of the frame or yoke 70 is comparatively slow. As soon, however, as the teeth of the cogs 62 engage the laterally projecting teeth 69 of said gears which occurs at the end of the upward movement of the yoke, the speed of rotation of said gears is materially increased owing to the fact that the cogs 62 are larger than the pinions 63. It will be observed that the teeth 69 on gears 67 extend from an arc in line with the base of the teeth 68 whereby, as long as the cogs 62 remain engaged with said teeth, the teeth of the pinions 63 are out of contact with the periphery of the gears 67. During this latter portion of the rotation of the gears 67, the pump rod is being forced downwardly at high speed. As shown in the accompanying drawings, substantially two revolutions of the shaft 61 will be required to complete the up-stroke of the pump rod while only one revolution of said shaft will be necessary to lower the rod. In this manner much time and considerable power is saved in the operation of pumps of this character.

While my improved pump is primarily designed as a power actuated pump, it is capable of manual operation and to this end I provide suitable mechanism which may be easily and quickly connected to the pump rod to reciprocate the same by hand when only small quantities of water are desired. The same includes a reciprocatory rack bar 73 which is movably disposed through a rectangular sleeve 74 centrally formed upon the cross bar 72 of the pump yoke or frame. Upon this sleeve the laterally extending arms 75 are formed and are connected at their outer ends to provide a bearing for one end of a spring 76 arranged upon the rod 77 slidably disposed through an aperture in the connected ends of said arms. One end of this rod is enlarged as shown at 78 and is adapted to be projected through the alined openings 79 in the walls of the sleeve 74 and a coinciding opening 80 in the rack bar 73, by the expansive action of the spring 76. Upon the other end of the rod 77 a hand wheel 81 is formed which is provided upon its face with an integral laterally extending pin 82 for engagement with the connected ends of the arms 75. The lower portion of the bar 73 is provided with a longitudinal series of rectangular openings 83 to provide a rack with which the teeth of a gear segment 84 co-acts. This gear segment is fixed upon a shaft 85 journaled in the spaced arms 86′ formed upon the plate 86. An operating handle 87 is bifurcated at one end to provide spaced arms 88 which are loosely mounted upon the shaft 85 upon opposite sides of the segmental gear 84. The operating handle 87 is also provided with a longitudinal channel 89 to receive the movable locking member 90. This member consists of a metal bar 91 provided with the flanges 92 upon opposite sides which slide upon the edges of the channel portion of the handle and act as guides for said bar. This metal bar is also provided upon one end with a laterally extending threaded bolt or shank 93 which is disposed through an opening provided in the handle bar. A nut 94 is threaded upon the end of the bolt and is adapted to be adjusted thereon to hold the locking member within the channel of said handle. The locking member 90 is provided upon its other end with a longitudinally extending cylindrical stem 95 upon which a coiled spring 96 is arranged. The end of this stem is disposed within a cylindrical recess or socket formed in the end wall of the channel 89 of the handle, against which one end of said spring bears. The other end of the spring engages the body of the locking member and normally acts to force the same outwardly in the channel of the handle and engage the same in a notch 97 which is provided in the periphery of the segmental gear 84, thereby locking the handle and the gear together. This notch is of greater width than the space between the gear teeth. The lower end of the rack bar 73 is connected to the upper end of the pump rod and a spring 98 is arranged upon said rod between the rack bar and a head 99 through which the pump rod extends. This head is arranged between the air and water tubes or pipes 13 and 14 and is rigidly secured in position by means of the plates 100 which are clamped upon said pipes.

When it is desired to operate the pump by hand, the rod 76 is drawn outwardly or retracted against the tension of the spring 75 to disengage the enlarged end thereof from the opening in the rack bar 73. The operat-

ing handle 87 is now locked upon the segmental gear 84 in the manner previously described and by raising and lowering the same, the pump rod is reciprocated to draw the water from the well. The spring 99 acts to limit the downward stroke of the pump rod in the hand operation of the device.

In order to move the locking member 90 to a retracted position and retain the same in such position upon the application of power to the pump, I provide a key 101. This key is rotatably mounted in the opposite side walls of the channel 89 in the handle 87 and is provided with a crank 102 which is received in a notch 103 in the body of the locking member 90. When this key is turned to the position shown in Fig. 14, the crank portion thereof engaging the wall of the recess of the locking member moves said member inwardly in the channel of the operating handle, and as the crank portion of the key is disposed to one side of the longitudinal axis of the stem 96 of said locking member, the tension of the spring serves to hold the key in such position whereby the locking member is held out of engagement with the notch in the segmental gear. The laterally extending bolt 93 on the end of said locking member is movable in the short slot or longitudinal opening 104 in the handle during the sliding movement of said locking member. After the handle has thus been released from the segmental gear, the rod 76 is rotated so as to dispose the finger 78 out of contact with the end of the arms 75 whereby the spring will force the enlarged end of the rod through the openings in the sleeve 74 and the coinciding opening in the bar 73, thus locking said bar to the reciprocatory pump yoke or frame.

From the foregoing description taken in connection with the accompanying drawings, it is thought that the construction and manner of operation of the various parts of my improved pump mechanism will be fully understood.

The device is highly efficient in operation, and provides means whereby the water may be pumped with a minimum expenditure of power.

By the provision of my specific form of three-way valve and the exceedingly simple and effective operating means for the valve member, the flow of water may be readily directed as desired.

The time and labor required in the installation of pump mechanism constructed in accordance with my invention is also materially reduced.

The various elements of the construction are also of simple form and may be replaced when necessary at a very slight expense.

While I have shown and described the preferred construction and arrangement of the various elements, it will be understood that the invention is susceptible of a great many modifications without departing from the essential feature or sacrificing any of the advantages embodied therein.

Having thus described the invention what is claimed is:—

1. The combination with a well casing having an opening in its wall and a lateral fluid conducting pipe extending from said opening, of a fluid directing valve adapted to be arranged within said casing and having a lateral outlet port, and means movable between the casing and valve and engaging the same to move the valve and effect a water-tight connection between the port thereof and the lateral conducting pipe.

2. The combination with a well casing having an opening in its wall intermediate of its ends and a lateral fluid conducting pipe extending from said opening, of a fluid directing valve adapted to be arranged within the well casing and having a lateral outlet port to register with the conducting pipe, and means carried by said valve co-acting with the wall of the well casing and engaging the valve to move the same and effect a water-tight connection between the outlet port and the conducting pipe.

3. The combination with a well casing having an opening in its wall intermediate of its ends and a conducting pipe extending from said opening, of a fluid controlled valve adapted to be arranged within said casing and having a port to register with the conducting pipe, and a fulcrumed element carried by said valve to co-act with the wall of the well casing and engage and move said valve to effect a water-tight joint between the valve port and the conducting pipe.

4. The combination with a well casing having an opening in its wall intermediate of its ends and a conducting pipe extending from said opening, of a fluid controlling valve adapted to be arranged within said casing and having an outlet port to register with the conducting pipe, and manually operable means movably mounted upon said valve to co-act with the casing wall and engage and move said valve to effect a water-tight connection between the valve outlet port and the conducting pipe.

5. The combination with a well casing having an opening in its wall intermediate of its ends and a conducting pipe extending from said opening, of a fluid controlling valve adapted to be arranged within the well casing and having an outlet port to register with the conducting pipe, an element fulcrumed upon said valve to co-act with the casing wall and engage the valve to force the valve laterally and effect a water-tight connection between the port thereof and said conducting pipe, and means connected to said element for actuating the same.

6. The combination with a well casing

having an opening in its wall intermediate of its ends and a conducting pipe extending from said opening, of a fluid controlling valve adapted to be arranged within said casing and having an outlet port to register with the conducting pipe, a movable element mounted upon said valve to co-act with the casing wall and engage and move the valve laterally in said casing to effect a water-tight connection between the port thereof and the conducting pipe, and means connected to said element and extending above the upper end of the well casing whereby said element is moved into engagement with the casing wall.

7. The combination with a well casing having an opening in its wall intermediate of its ends and a conducting pipe extending from said opening, of a fluid controlling valve adapted to be arranged within said casing and provided with an outlet port to register with the conducting pipe, a yoke-shaped plate fulcrumed upon said valve, and means connected to said plate and extending above the upper end of the well casing to move the plate and engage the intermediate portion thereof with the wall of the casing and with the valve to effect a lateral movement of the valve in the casing and form a water-tight joint between the valve port and the conducting pipe.

8. The combination with a well casing having an opening in its wall intermediate of its ends and a conducting pipe extending from said opening, of a fluid controlling valve adapted to be arranged within said casing and having an outlet port, an element fulcrumed upon the valve casing to engage the wall of the well casing and the valve to force the valve laterally in the casing and effect a water-tight connection between the outlet port of said valve and the conducting pipe, and a pair of rods connected to said element to move the same, the upper ends of said rods extending above the well casing and being provided with means to retain said element in engagement with the casing wall.

9. The combination with a well casing having an opening in its wall intermediate of its ends and a fluid conducting pipe to be connected to said opening, of a union to which one end of the pipe is adapted to be connected, said union being provided with a nipple extending through the opening in the casing wall, a fluid controlling valve adapted to be arranged within the well casing and having an outlet port, said valve being provided with a flange projecting laterally from the port and adapted to engage said nipple to limit the downward movement of the valve, and means engaging the casing and valve to force the valve laterally within the well casing to effect a water-tight connection between the outlet port thereof and said nipple.

10. The combination with a well casing having an opening in its wall intermediate of its ends and a fluid conducting pipe, of a nipple connecting said pipe and the well casing, said nipple projecting through the opening of the casing and within the same, a fluid controlling valve adapted to be lowered within the well casing and having an outlet port, a laterally extending horizontal flange to engage the inwardly projecting portion of the nipple and limit the downward movement of said valve, the valve casing being further provided with a second flange of inverted U-shaped form projecting laterally around the outlet port thereof to provide a recess to receive the inwardly extending port of the nipple, and means arranged in the valve casing for bodily moving said valve in a lateral direction to effect a water-tight connection between the port thereof and said nipple.

11. The combination with a well casing having an opening in its wall intermediate of its ends and a conducting pipe to be connected to said casing, of a connecting nipple between the pipe and casing extending through the opening in the wall of the latter, a retaining rod consisting of two jointed sections connected to said nipple and embracing the well casing, a fluid controlling valve adapted to be lowered within the well casing provided with an outlet port, the valve casing being provided with a stop flange to engage the connecting nipple and register the outlet port of the valve with said nipple, and manually operable means carried by the valve to co-act with the wall of the well casing and the valve and effect a water-tight connection between the valve outlet port and said nipple.

12. The combination with a well casing having a lateral outlet port and a nipple arranged in said port and extending into the casing, of a fluid directing valve to be inserted in said casing and provided upon its lower end with an annular flange to rest upon said nipple, said valve having a lateral outlet port, said annular flange being provided with a vertical inverted U-shaped portion opposite the port in said valve, said valve being adjustable in a rotary direction within the casing to position said nipple within the U-shaped flange and aline the lateral outlet ports of the valve and the casing.

13. The combination with a well casing having an outlet port in its annular wall, a nipple and means for removably securing the same in said port, of a fluid directing valve adapted to be arranged within said casing and having a lateral outlet port, said valve being provided with means whereby

its port is caused to register with the port of the casing as the valve is lowered into said casing, and means mounted upon the valve and movable with respect thereto into engagement with the valve and well casing to move the valve bodily and effect a water-tight connection between its outlet port and said nipple.

14. The combination with a well casing having an opening in its wall and a lateral fluid conducting pipe extending from said opening, of a fluid directing valve adapted to be arranged within said casing and having a lateral outlet port to aline with said conducting pipe, and means movable between the valve and well casing and engaging therewith to force said valve laterally within the well casing to effect a water-tight connection between its outlet port and the conducting pipe.

15. The combination with a well casing having an opening in its wall and a lateral fluid conducting pipe extending from said opening, of a fluid directing valve adapted to be arranged within said casing and having a lateral outlet port to register with the opening in the casing, studs on opposite sides of the valve casing, and means supported upon said studs movable into engagement with the wall of the casing and the valve and move the valve laterally to effect an air-tight connection between its outlet port and the conducting pipe.

16. The combination with a well casing having an opening in its wall and a conducting pipe extending therefrom, of a fluid directing valve adapted to be arranged within said casing and having an outlet port to register with the conducting pipe, a yoke embracing the lower portion of the valve casing, and means for moving said yoke with respect to the valve casing to cause the yoke to bind against the casing wall and engage the valve to force the valve laterally in said casing to effect a water-tight connection between its outlet port and the conducting pipe.

17. The combination with a well casing having an opening in its wall and a conducting pipe extending from said opening, of a fluid directing valve adapted to be arranged within said casing and having an outlet port to register with the conducting pipe, and means arranged within the well casing and manually actuated exteriorly of said casing to engage the same with the casing and valve and force the valve laterally within the casing and effect a water-tight connection between its outlet port and the conducting pipe.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

BENJAMIN F. MOHR.

Witnesses:
M. C. LYDDANE,
GEO. S. LIVINGSTON.