

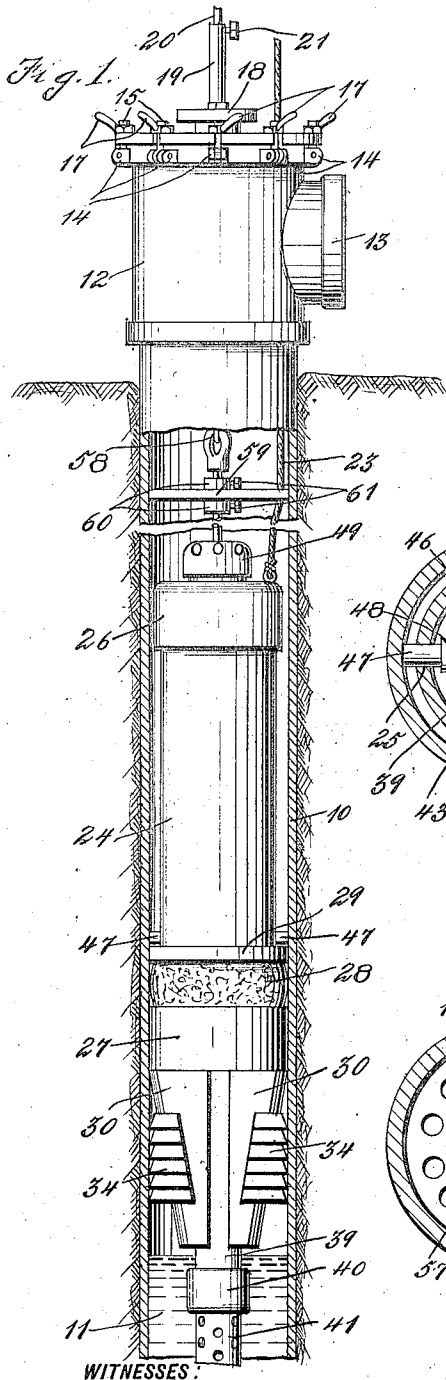
E. A. McCURDY.
PUMP.

APPLICATION FILED MAR. 20, 1913.

1,092,159.

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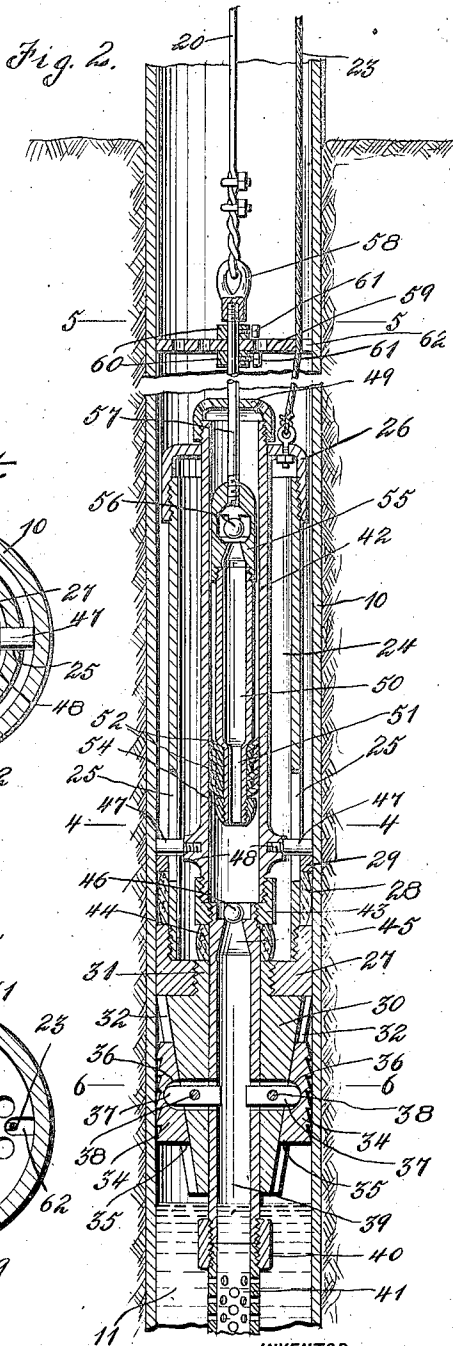
2 SHEETS—SHEET 1.



WITNESSES:

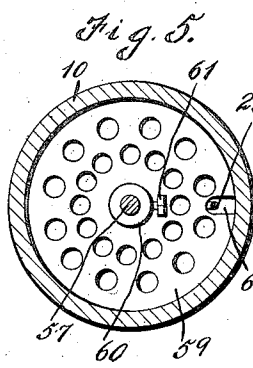
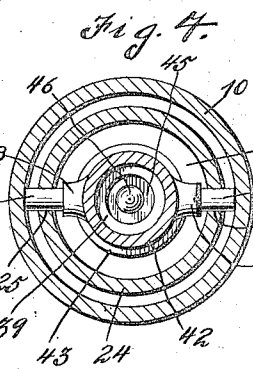
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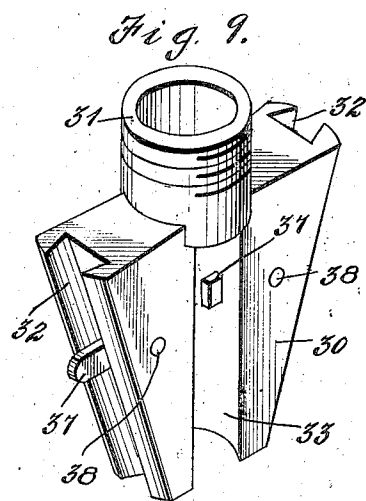
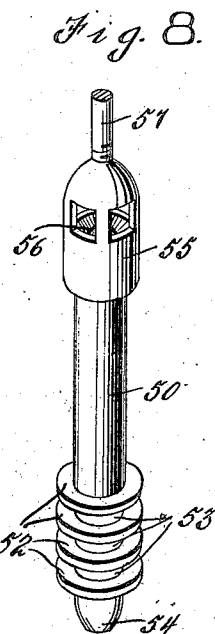
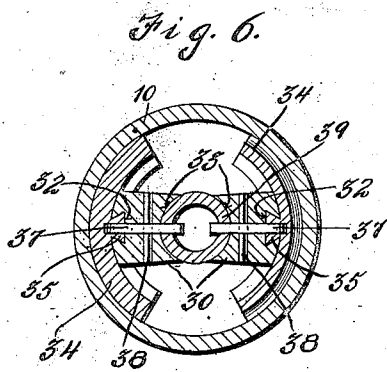
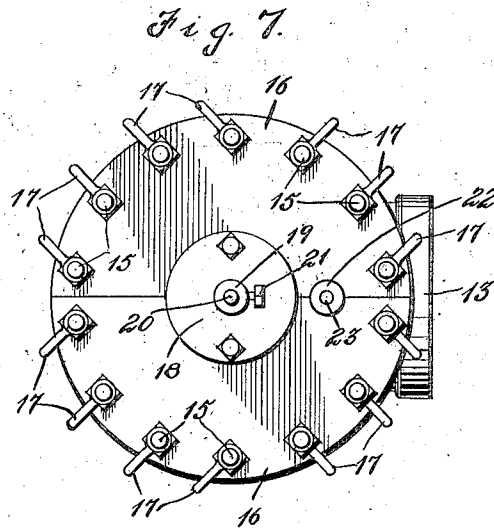
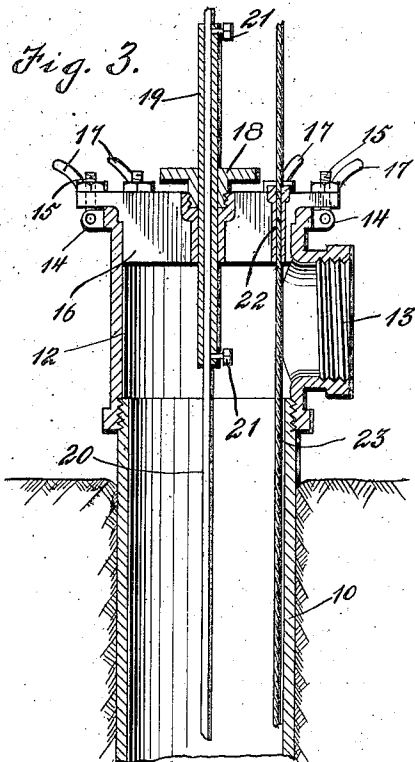


By E. E. Noorman his ATTORNEY.

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2 SHEETS—SHEET 2.



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PUMP.

1,092,159.

Specification of Letters Patent.

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Application filed March 20, 1913. Serial No. 755,729.

To all whom it may concern:

Be it known that I, ERNEST A. McCURDY, citizen of the United States, residing at Taft, in the county of Kern and State of California, 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 a pump which is intended to be used in connection with very deep wells.

One of the objects of the invention is to provide a pump which may be used in connection with a very deep oil or water well and which will operate very efficiently.

Another object of the invention is to provide a device for securely holding the pumping apparatus in position thus preventing it from being worked loose by the operation of pumping.

Another object of the invention is to provide an improved type of pumping plunger so constructed that the oil may be sucked into the working barrel and then forced through the plunger and out through the top of the barrel.

Another object of the invention is to provide the barrel with side pins which will prevent the pump from turning, and thus causing its several parts to work loose.

With these and other objects in view this invention consists of certain novel combinations, constructions, and arrangements of parts as will be hereinafter fully described and claimed.

In the accompanying drawings:—Figure 1 is a view showing the casing partially in section with the remaining portions of the pump in elevation. Fig. 2 is a vertical sectional view through the pump. Fig. 3 is a vertical sectional view through the upper portion of the casing shown in elevation in Fig. 1. Fig. 4 is a transverse sectional view along the line 4—4, in Fig. 2. Fig. 5 is a transverse sectional view along the line 5—5, in Fig. 2. Fig. 6 is a transverse sectional view along the line 6—6, in Fig. 2. Fig. 7 is a top plan view of the pump. Fig. 8 is a perspective view of the plunger. Fig. 9 is a perspective view of the slip spider which causes the setting slips to grip the casing.

Referring to the accompanying drawings

it will be seen that a casing 10 is placed in the well and extends to such an extent that its lower end portion is embedded in the oil or water 11. The upper end of the casing 10 extends above the ground and is provided with a threaded end portion upon which there is screwed the cap T 12 from which there extends the usual arm 13. This cap T is provided with pivot ears 14 with which the threaded bolts 15 are connected so that when the sectional packing head 16 is put in place the bolts may be passed through openings formed in the packing head, the packing head being secured in place by the tail nuts 17. A gland 18 is carried by the packing head, and a polish clamp 19 which is secured to the pumping line 20 by means of the set screws 21 is slidably mounted in this gland 18, thus causing the pumping line to run freely. A second gland 22 is mounted between the sections of the packing head 16 to permit the setting line 23 to run easily.

The pumping mechanism is mounted in the lower portion of the casing 10 and comprises a set pipe 24 provided with longitudinally extending slots 25 and having threaded end portions with which there are connected the cap 26 and the collar 27. A packing ring 28 surrounds the set pipe 24 just above the collar 27 and is held in place by a protecting washer 29. This washer is placed above the packing ring for the purpose of preventing the packing ring from working up the pipe 24 and also to protect it from contact with the pins to be hereinafter described, and thus prevent the pins from wearing the upper portion of the packing ring.

A slip spider 30 which is shown in Fig. 9 is provided with a hollow externally threaded neck 31, and this neck is screwed into an opening formed in the collar 27, thus removably connecting the spider with the collar. The spider is tapered and is provided with edge grooves 32 and with a central slot 33 forming a continuation of the hollow interior of the neck 31. It will thus be seen that when this spider is in place that the pipe which passes through the spider may move freely. Semi-circular slips 34 which are provided with teeth as shown in Figs. 1 and 2 are slidably connected with the spider

by the ribs 35 traveling in the grooves 32 and are provided with recesses 36 in which the outer end portions of pivot lugs 37 forming levers fit. These levers 37 are mounted upon pivot pins 38 and extend into the slot 33 so that they may enter openings formed in the anchor pipe 39 and thus be moved by the anchor pipe to bring the slips into and out of engagement with the casing 10. It should be noted that the ends of the levers 37 are curved as well as the inner walls of the pockets 36, thus permitting the levers to move readily. A collar 40 connects the lower end of the anchor pipe with the suction nozzle 41 and also serves as a means for engaging the lower end of the spider when it is desired to remove the device from the casing.

A working barrel 42 is mounted in the set pipe 24 and has its lower end connected with the inner end of the anchor pipe 39 by the reducing collar 43. A packing ring 44 surrounds the anchor pipe 39 just beneath the collar 43 and constitutes a cushion for supporting the working barrel 42. The inner end portion of the anchor pipe is formed into a valve seat 45 and a ball valve 46 is mounted in the cup shape inner end portion of the anchor pipe and rests upon the valve seat, thus permitting the oil or water to be sucked up through the anchor pipe into the working barrel but prevents it from passing back into the bottom of the well. Pins 47 are threaded into shoulders 48 and extend through the slots 25 above the protecting ring 29. It will thus be seen that these pins will afford means for assisting in withdrawing the pump from the well and will also act as supports for the working barrel, and as a means for applying weight to the packing ring 28 to cause it to fit tightly against the casing 10. The upper end of the working barrel is slidable through the cap 26 and carries a perforated cap 49 which permits the oil or water in the barrel to be forced out into the casing 10 above the pump.

The plunger 50 which is illustrated in Figs. 2 and 8 is provided with a reduced inner end 51 upon which the cups 52 and spacing washers 53 are mounted. These cups are preferably formed of leather or some other suitable material and are held in place by a nut 54 screwed upon the end of the plunger. A valve housing 55 is threaded upon the upper end of the plunger and carries a ball valve 56, thus permitting the oil or water in the working barrel to be forced through the plunger upon the down stroke and into the upper portion of the working barrel. Upon the return stroke the cups 52 will force the water in the upper portion of the working barrel out of the openings in the perforated cap 49 into the casing 10.

The pump rod 57 passes through the per-

forated cap 49 and has its inner end connected with the upper portion of the valve housing 55 so that the plunger may be operated. It is, of course, obvious that all of the various parts of this device may be made any length or diameter necessary in order to cause the pump to work properly. The pump rod is of a suitable length and has its outer end connected with the pipe line by a suitable screw eye 58. A guiding disk 59 which is perforated is rigidly secured upon the upper end portion of the pump rod by means of the collars 60 and held in place by the set screws 61 and prevents the pump rod from becoming tangled with the setting line 23 which line passes through an opening 62 formed in the edge portion of the guiding disk.

The operation of this pump is as follows: The casing 10 is driven into the well in the usual manner to a point below the water level and the pumping device is then lowered into the casing until the anchor pipe is embedded in the water as shown in Figs. 1 and 2. This pumping device is lowered by means of the line 23 with the line 20 held in such a position that the working barrel will be drawn upwardly, thus raising the anchor pipe and permitting the levers 37 to be rocked, thus holding the slips 34 out of engagement with the sides of the casing. When the pumping device is at the desired point the line is released and this will cause the working barrel to be lowered, thus moving the levers 37 to force the slips 34 up the spiders and bringing them into engagement with the sides of the casing. The weight of the pumping device will cause the teeth of these slips to grip the sides of the casing, thus preventing the pumping device from slipping. From an inspection of Fig. 2 it will be seen that when the device is in this position that the pins 47 by pressing upon the ring 29 compresses the packing ring 28, thus forcing it tightly into engagement with the casing 10 and preventing water or oil in the upper portion of the casing from leaking back into the bottom of the well. It will also be seen that when the collar 43 rests upon the packing ring 44 that it compresses this ring and thus causes a water tight joint between the anchor pipe 39 and spider 30.

When it is desired to raise the water from the bottom of the well the line 20 is drawn upwardly by a suitable mechanism and this raises the pump rod 57 which rod carries with it the plunger 50. As the plunger rises it forms a suction which draws the water through the anchor pipe past the valve 46 and into the lower portion of the working barrel. The pump rod is then permitted to descend and this will cause the water in the bottom of the working barrel to be forced through the plunger 50 out through the

valve housing 55 and into the upper portion of the working barrel. Upon the plunger being again drawn upwardly the cups 52 will cause the water to be forced through the perforated cap 49 and into the casing 10 above the pumping device. When this operation has been repeated a sufficient number of times the water in the upper portion of the casing 10 will be raised to such an extent that it will be caused to flow out through the outlet arm 13 and can then be conveyed to any suitable place by any desired conduit. When it is desired to remove the pumping device the packing cap 16 may be removed and upon drawing the lines 20 and 23 upwardly the plunger will be brought into contact with the cap 49, thus raising the working barrel to remove the weight of the barrel from the ring 29 and cause the levers 37 to be rocked upon their pivot pins 38, thus forcing the slips 34 out of engagement with the casing 10. The pumping device will then be free from the casing and can be easily withdrawn from the casing by simply winding the lines and drawing the pumping device out through the upper end of the casing.

Having thus described the invention what is claimed as new, is:—

1. In a pump, a casing, pumping means in said casing comprising a set pipe, a spider connected with said set pipe, an anchor pipe passing through said spider into said set pipe, gripping slips slidably connected with said spider, levers pivotally connected with said spider and engaging said anchor pipe and slips whereby movement of said anchor pipe will move said slips into and out of engagement with said casing, a working barrel slidably mounted in said set pipe and connected with the inner end portion of said anchor pipe, an inwardly opening valve at the inner end of said anchor pipe, and a plunger slidably mounted in said working barrel whereby fluid may be sucked into said working barrel and forced past said plunger and forced from the upper end of said barrel into said casing.

2. In a pump, a casing, pumping means in said casing comprising a set pipe, a spider connected with said set pipe, gripping slips carried by said spider, an anchor pipe passing through said spider into said set pipe, operating means for said slips operated by said anchor pipe, a packing surrounding said set pipe, a packing surrounding the inner end portion of said anchor pipe, a working barrel slidably mounted in said set pipe, a collar connecting said working barrel with said anchor pipe and resting upon the packing ring surrounding said anchor pipe, an inwardly opening valve carried by said anchor pipe, arms extending from said working barrel through said set pipe for compressing the

packing ring surrounding said set pipe, a pumping plunger slidably mounted in said working barrel, and an outwardly opening valve carried by said plunger.

3. In a pump, a casing, pumping means in said casing comprising a set pipe, an anchor pipe extending into said set pipe, a working barrel slidably mounted in said set pipe, a packing ring surrounding said anchor pipe, a collar connecting said working barrel with said anchor pipe and resting upon said packing ring for compressing the same, an inwardly opening valve carried by said anchor pipe, a packing ring surrounding said set pipe, means extending from said working barrel through said set pipe adapted to compress said last mentioned packing ring, a plunger slidably mounted in said working barrel, and an outwardly opening valve carried by said plunger.

4. In a pump, a casing, pumping means in said casing comprising a set pipe, a spider connected with said set pipe, gripping slips carried by said spider, operating means for said slips, packing rings carried by said set pipe, common means for compressing said packing ring and manipulating the operating means for said slips, and a pumping plunger.

5. In a pump, a casing, pumping means in said casing comprising a set pipe, a cap for said set pipe, an anchor pipe extending into the lower end portion of said set pipe, a working barrel extending through the cap of said set pipe into the interior thereof and having its inner end connected with said anchor pipe, an inwardly opening valve adjacent the inner end of said anchor pipe, a perforated cap for said working barrel limiting the inward movement of said barrel, a plunger slidable in said working barrel, a pump rod extending through said last mentioned cap and engaging said plunger, and an outwardly opening valve carried by said plunger.

6. A pump comprising a casing, pumping means in said casing, a pump rod extending through said casing and having its inner end connected with said pumping means, a perforated guiding disk adjustably mounted upon said pump rod, an operating line connected with said pump rod, and a second line passing through said guiding disk and connected with said pumping means.

7. A pump comprising a casing, a fitting at the inner end of said casing, bolts connected with said sleeve, a packing head fitting in said fitting and provided with a flange overhanging said fitting, said bolts being passed through the flange of said packing head and having securing means engaging said head to hold the same in place, a gland carried by said head, a fitting in said gland, a line passing through said last mentioned fitting and having said last men-

tioned sleeve adjustably connected there-
with, pumping means in said casing and con-
nected with said line, a second gland carried
by said head, and a second line passing
5 through said second gland and having its
inner end connected with said pumping
means.

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

ERNEST A. McCURDY.

Witnesses:

FRED J. MUHOY,
C. C. FARROT.