J. E. GABLE.

WELL PUMP.

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1,036,824.

Patented Aug. 27, 1912.

Fig. 1.

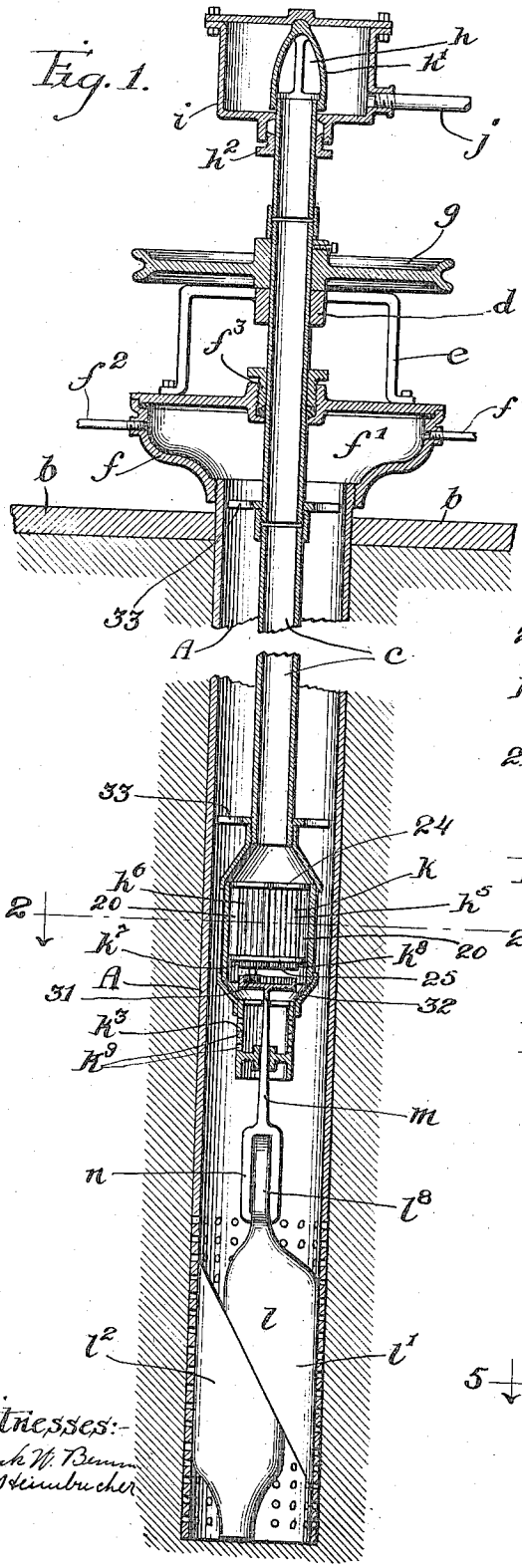


Fig. 2.

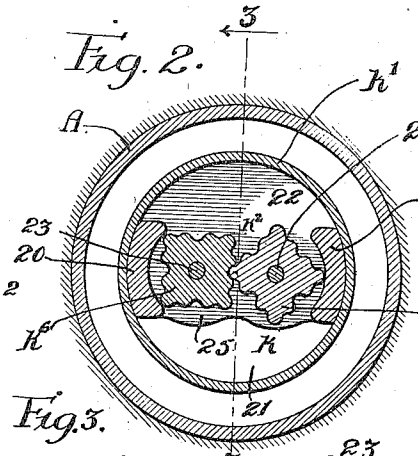


Fig. 3.

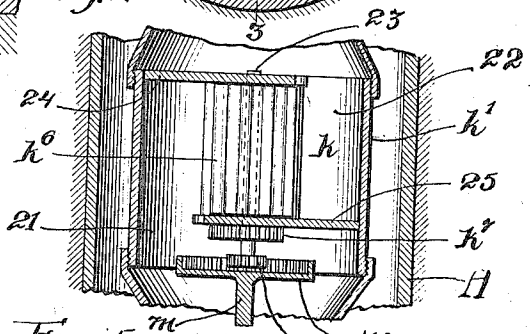


Fig. 5.

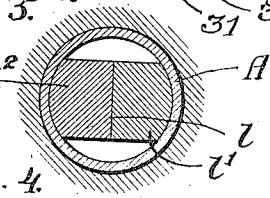
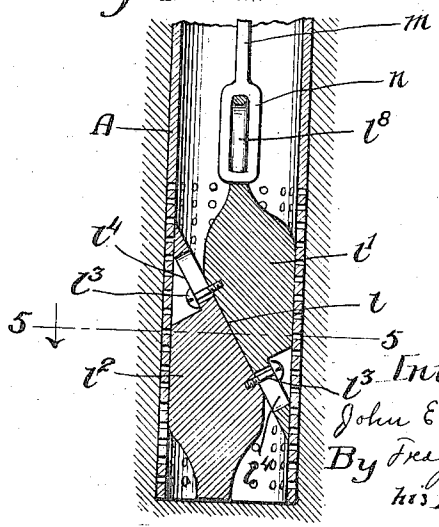


Fig. 4.



Witnesses:-

Frank W. Bemm

W. Steinbrecher

Inventor:

John E. Gable

By Fraylerlach

his Atty.

UNITED STATES PATENT OFFICE.

JOHN E. GABLE, OF EVANSTON, ILLINOIS.

WELL-PUMP.

1,036,824. Specification of Letters Patent. Patented Aug. 27, 1912.

Application filed August 28, 1908. Serial No. 450,614.

To all whom it may concern:

Be it known that I, JOHN E. GABLE, a resident of Evanston, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Well-Pumps, of which the following is a full, clear, and exact description.

The invention relates to pumping-apparatus for wells.

In well-pumping apparatus heretofore devised in which a rotary pump was employed for lifting the liquid it has been necessary to provide a pipe for conducting the fluid from the pump at or near the bottom of the well to the surface and in addition thereto another longitudinally extending element, such as a shaft for operating or effecting rotation of one of the pump elements necessary to raise the water to the surface and through said pipe.

One of the main objects of the present invention is to provide an improved apparatus in which the pipe through which the water is lifted serves also as means for transmitting power or revolution to one of the pump-elements necessary to cause the water to be lifted through the pipe. Resultantly, when a pipe serves the double purpose of a fluid-conductor and a drive-shaft, the necessity of employing a shaft extending from the top to the bottom of the well is avoided. This feature of advantage is particularly important in deep wells. Furthermore, all the attendant disadvantages of employing a long shaft or line of shafting, likely to become out of alinement will be entirely avoided.

The invention further designs to provide improved mechanism which will be automatically secured in the well-pipe when lowered to the bottom thereof to hold one of the pump-elements to effect proper coöperation of the several elements of the pump.

The invention also designs to provide improved pumping-apparatus for wells, which is simple in construction and efficient in operation.

In the drawings: Figure 1 is a section of a well and apparatus embodying the invention. Fig. 2 is a section on an enlarged scale taken on line 2—2 of Fig. 1. Fig. 3 is a section on line 3—3 of Fig. 2. Fig. 4 is a section through the pump-anchor. Fig. 5 is a section on line 5—5 of Fig. 4.

A denotes a sunken well-pipe extending from the bottom of the well to the usual platform *b* on the surface of the ground. A pipe *c* extends vertically through the well-pipe and is journaled near its upper end in a suitable bearing *d* on a suitable support *e*. A head *f* is connected to the open upper end of the well-pipe and support *d* is mounted, for convenience, on said head. A chamber *f'* is formed in the head *f* and one or more pipes f^2 are connected to said chamber to carry off the gases from the well-pipe when the improved apparatus is employed for pumping oil-wells or those containing gases. Pipe *c* extends through a suitable packing-box f^3 in the head *f* to prevent leakage of gases around the pipe. A pulley *g* is secured to the upper end of pipe *c*, serving as a means for driving or rotating said pipe.

The liquid is raised from the well by a rotary-pump *k* which forces it through the pipe *c*. A pipe-terminal *h* having outlet openings *h'* therein is secured to the upper end of the outlet pipe *c* and on the upper end of said head, is a suitable bearing h^2 for a casing *i*, into which the liquid is discharged through the openings *h'* in the pipe-head *h* and a pipe *j* may be employed for conducting the fluid to any point desired.

Rotary pump *k* serves as the means for lifting the liquid from the bottom of the well, through the pipe *c* and into the casing *i*. This rotary pump comprises essentially two elements, a casing *k'*, and a piston k^2, one of which is revoluble relatively to the other to force fluid through the pipe *c*. In the embodiment of the invention illustrated, the pump casing *k'* is secured to rotate with the pipe *c* and a part of the piston is held against rotation with the casing to effect the relative movement of the pump elements to force the fluid upwardly through the pipe *c*.

An anchoring-device *l* adapted to be automatically secured to the well-pipe A when the pump is lowered, is provided for securing one of the pump-elements against rotation with the pump-casing to render the pump operative to lift the liquid. This anchoring-device *l* comprises a pair of wedge-blocks l', l^2, slidably connected together by pins l^3, and slots l^4 formed in the wedge-blocks respectively so that when the anchoring-device is lowered in the well-pipe and the wedge-block l^2 encounters an obstruction, such as the bottom of the well, it will be arrested and the other wedge-block l' may be

forced downwardly to cause the anchoring-device to become locked to the well-pipe, thus securing it against rotation therein.

The connection between the upper wedge-block l' and the pump-piston consists of a rod m having its lower end slotted and an elongated eye l^8 or staple n on the wedge-block l' which extends through the slot in the lower end of the rod m. This constitutes a lost-motion connection to permit relative vertical movement of the pump-rod with respect to the anchoring-device but which secures the pump-rod against rotation with the pump-casing. When the lower end of the rod n engages the eye l^8 on the upper wedge-block l' as illustrated in the drawings, the pump-rod will force the upper wedge-block downwardly to lock the anchoring-device to the well-pipe. So also, when the pump is to be removed from the pipe, and the pipe c is raised, the connection serves to raise the wedge-block l' until the anchoring-device has been unlocked or released from the well-pipe. Therefore this anchoring-device is automatically rendered operative and inoperative when the pump is lowered or raised respectively.

The pump employed is preferably one which forces the liquid upwardly and positively. The lower end of the pump-casing is connected to a pipe k^3 having perforations k^9 therein, through which the liquid will pass to the inlet-chamber 21 of the casing at one side of the piston. The piston comprises a pair of toothed members k^5 and k^6, geared together by pinions k^7 and k^8. The piston-members have longitudinally interfitting ribs or faces and grooves so that when they are rotated relatively, fluid will not pass between the piston-members. The pump-casing is provided with a segmental inner periphery 20 at each side of one of the piston-members so that during relative rotation of the casing with respect to the piston-members the fluid in the spaces between the outer ribs of the piston-members will be confined between the piston-members and the walls 20 and forced from the inlet-chamber 21 to the outlet-chamber 22 at the opposite sides of the piston-members. Each piston-member is provided with a stud or shaft 23, journaled in horizontal walls 24 and 25 at the top and bottom of said members respectively. An internally toothed gear 30 is secured to the upper end of anchor-rod m which meshes with a pinion 31 on one of the piston-studs. In operation, when the pump-casing is rotated, one of the piston-members being held against rotation with the pump-casing by the anchor-rod m and gears 30 and 31, relative rotation of the piston-members with respect to the piston-casing will result to cause these members to force the liquid from the inlet-chamber to the outlet-chamber of the casing. Resultantly, the necessary relative rotating-movement of the piston-members to force the liquid from one side of the piston to the other, is effected by rotation of the casing and holding one of the piston-members against rotation.

In practice the pipe c is usually constituted of sections coupled together and spiders 33 fitted to the outside of the sections, guide said pipe in the well-pipe and position it centrally therein.

In operation, when the well-pipe has been forced into the ground, the pipe c with the pump and anchoring-device connected to its lower end, is lowered into the well-pipe. When the lower wedge-block l^2 encounters the bottom of the well it will be arrested and by forcing the pipe c downwardly, anchor-rod m will then force the upper wedge-block l' downwardly until the anchoring-device has been locked to the well-pipe. The apparatus at the upper end of the well-pipe being then in place, pulley g will be driven to rotate the pipe c which will operate the rotary-pump to raise and force the liquid through the pipe c into the casing i.

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

1. In a well-pump, the combination of a well-pipe, a pipe extending downwardly into the well-pipe, means for rotating said inner pipe, a rotary pump in the well-pipe and comprising a piston and a casing, said casing being connected to the lower end of said pipe and driven thereby, the piston comprising a plurality of members pivoted in the casing, and a vertically adjustable anchoring device in the well-pipe and connected to one of the piston members for holding it to cause relative rotation of the pump and piston.

2. In a well-pump, the combination of a well-pipe, a pipe in the well-pipe, means for rotating said inner pipe, a rotary pump operatively connected to said pipe to raise the liquid, and an anchoring-device below said pump, comprising means whereby the anchoring-device will be rendered operative to engage the well-pipe when lowered into engagement with the bottom of the well.

3. In a well-pump, the combination of a well-pipe, a pipe in the well-pipe, means for rotating said inner pipe, a rotary pump operatively connected to said pipe and to raise the liquid, and an anchoring-device below said pump comprising wedges for engaging the well-pipe, one of said wedges being disposed at the bottom of the well pipe so as to engage the bottom of the well and render the device operative when lowered into said well pipe.

4. In a well-pump the combination of a well-pipe, a pipe in the well-pipe, means for rotating said inner pipe, a rotary pump operatively connected to the latter pipe to

raise the liquid, means for causing a relative movement between the pump elements, and an anchoring device below said pump comprising wedges for engaging the well-pipe, one of said wedges being disposed at the bottom of the well-pipe so as to engage the bottom of the well and prevent rotation of said means for causing relative rotation between the pump elements, and thereby render the device operative when said device is lowered into the well-pipe.

5. In a well-pump the combination of a well-pipe, a rotary pump adapted to operate in said pipe, means for operating the pump to raise the liquid, said pump comprising a casing and a piston, means for causing a relative movement between said casing and piston, an anchoring device below the pump and disposed at the bottom of the well-pipe, and a connection extending upwardly from said anchoring device and holding said means for causing a relative movement between said casing and said piston against rotation and thereby rendering said parts operative when the device is lowered into said well-pipe.

6. In a well-pump, the combination of a well pipe, a rotary pump adapted to operate in said pipe, means for operating the pump to raise the liquid, said pump comprising a casing and a piston, an anchoring-device below the pump, comprising two wedge blocks having their wedging surfaces in direct contact with each other.

7. In a well-pump, the combination of a well-pipe, a pipe in said well-pipe, means for rotating said pipe, a pump connected to the lower end of said pipe and comprising a casing and a piston, the casing being connected to rotate with said inner pipe, an anchoring-device, and a lost-motion and gear connection between the anchoring-device and said piston.

JOHN E. GABLE.

Witnesses:
FRED. GERLACH,
LEONE S. RUSSELL.