E. H. PERKINS.

ROTARY PUMP.

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1,049,761.

Patented Jan. 7, 1913.

Fig. 1.

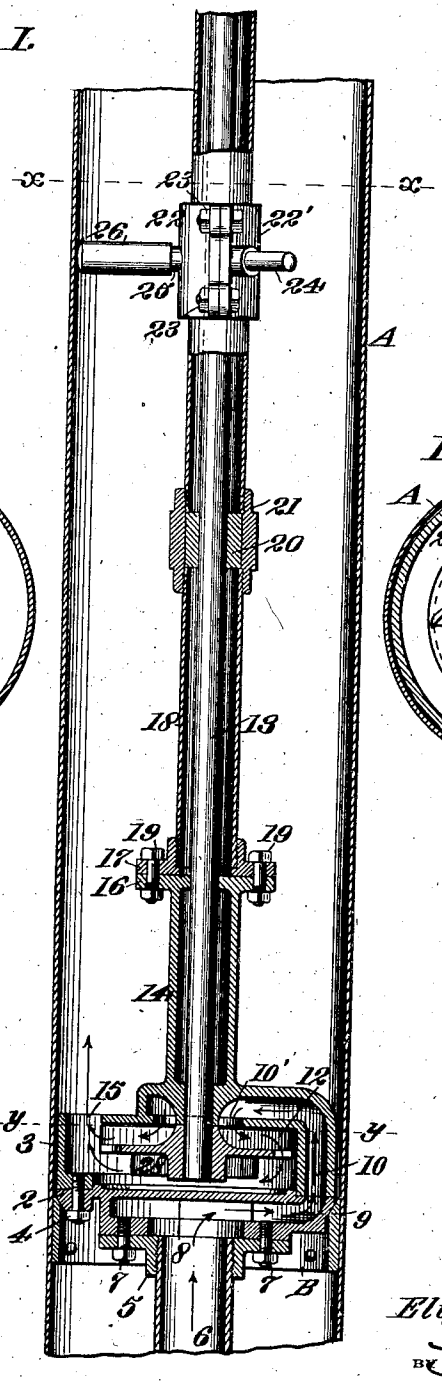


Fig. 2.

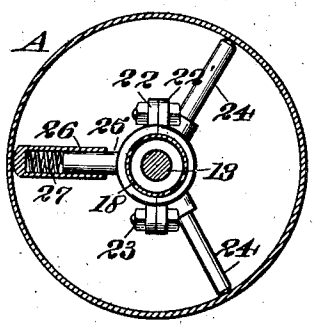
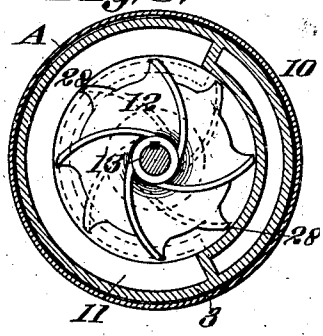


Fig. 3.



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ROTARY PUMP.

1,049,761. Specification of Letters Patent. Patented Jan. 7, 1913.

Application filed August 19, 1912. Serial No. 715,797.

To all whom it may concern:

Be it known that I, ELIJAH H. PERKINS, a citizen of the United States, residing at Dinuba, in the county of Tulare and State of California, have invented new and useful Improvements in Rotary Pumps, of which the following is a specification.

This invention relates to a deep well pump.

It is the object of this invention to provide a deep well pump of simple construction, which is efficient in operation, embodies the features of a balanced rotary pump, and is adapted to be lowered into a well casing to a point adjacent to or below the surface of the liquid to be pumped.

Another object is to provide a rotary pump in which the blade or runner is disposed horizontally in a casing so constructed that the intake section is above the runner and the discharge is from the underside thereof.

Other objects will appear hereinafter.

The invention primarily resides in mounting a turbine or runner on the lower end of a vertical revoluble shaft, disposing the blade in a housing having passages so formed therein that the liquid to be pumped will be drawn into the housing above the runner and be discharged from the underside of the runner into the discharge column, and adapting the housing and the runner therein to be lowered to a suitable point into the well casing.

It also comprises details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a view in vertical section of the invention as applied. Fig. 2 is a horizontal section on the line X—X of Fig. 1. Fig. 3 is a horizontal section on the line Y—Y of Fig. 1.

In the drawings the well casing is indicated at A, and B represents a collar or flange mounted on the interior thereof at any suitable point. The flange B is beveled on its upper edge and is designed as a support for a runner housing consisting of two parts 2 and 3, bolted together by means of bolts 4. The lowermost portion 2 of the housing is beveled on its lower outer edge to conform to the bevel on the flange B and rest thereon. The underside of the portion 2 of the housing is open and is formed with a horizontal flange around this opening, to which a flange coupling 5 on a suction pipe 6 may be secured by means of bolts 7; the pipe 6 extending to a suitable point below the liquids in the well casing A. The upper side of the lower portion 2 of the housing is closed to separate its interior from that of the upper portion 3 by means of a horizontal wall or partition 8, with the exception of a port 9, formed in the partition 8, which communicates with a passage 10 formed in the portion 3 of the housing. This passage 10 leads upwardly in the housing, thence inwardly and opens to the interior of the portion 3 on its upper side through an annular port 10′; a chamber 11 being formed in the portion 3 to which the passage 10 leads. The chamber 11 forms a casing for a turbine or runner 12, which is horizontally disposed therein, and is mounted on the lower end of a vertical revoluble shaft 13 extending through a hub 14 on the portion 3 of the housing, whence it leads upward to the top of the well casing A and is connected to any suitable means for rotation not here shown. The chamber 11 in the housing portion 3 communicates on its upper side with the interior of the well casing through a discharge port 15 disposed in the portion 3 of the housing at a point opposite the intake passage 10 and to one side of the runner 12. The blades of the runner 12 are so shaped that when it is rotated it will act to create a suction downwardly on its upper side to draw the liquids to be pumped upward through the pipe 6 and passage 10, and downward through the port 10′, then discharge it peripherally into the chamber 11 and force it into the well casing A through the port 15; the direction of flow of the liquid being indicated by the arrows in Fig. 1.

Formed on the upper end of the hub 14 is an outwardly extending flange 16, to which is secured a flange coupling 17 on the lower end of a pipe 18 by means of bolts 19. The pipe 18 surrounds the shaft 13 and extends upwardly therewith to a point adjacent to the upper end of the well casing and forms a guide for the shaft; bushings 20 being mounted in the couplings 21 joining sections of the pipe 18. The bushings 20 are formed of any suitable material and are held in place between the ends of adjacent sections of the pipe, as shown in Fig. 1. The pipe 18 is normally retained in its central posi-

tion by means of a centralizing device, (shown in detail in Fig. 2), which device consists of a pair of clamping members 22 and 22′ which are designed to surround the pipe 21 and be clamped thereto by means of bolts 23. Mounted on the clamp member 22′ is a pair of outwardly extending studs 24, the outer ends of which contact the inner face of the well casing A. Mounted on the clamp section 22 is a short stud 25 on which a sleeve 26 is slidably mounted. The outer end of the sleeve 26 normally contacts the inner wall of the well casing A and is retained in its outermost position by means of a helical spring 27 mounted within the sleeve 26 and bearing against the outer end of the stud 25. The spring 27 is of sufficient tension to retain the outer ends of the studs 24 in contact with the inner face of the well casing A. The centralizing devices are clamped on the pipe 18 at suitable points throughout its length.

In the operation of the invention, the shaft 18 is rotated in any suitable manner so as to revolve the runner 12 within the chamber 11 of its housing. The rotation of the runner 13 acts to create a suction within the chamber 11 tending to draw the fluids in the well upward through the pipe 6, passage 10, and port 10′, before described, and as indicated by the arrows in Fig. 1. The fluids thus drawn into the chamber 11 are discharged therefrom by the runner 12 through the port 15 and forced upward in the well casing A. Blades 28 are formed on the underside of the runner and extend in such a direction as to assist in the upward movement of the liquid.

From the foregoing it will be seen that the runner 12 and shaft 13 are balanced; the suction created by the runner on its upper side and the weight of the column of water in the well casing A bearing against the underside of the runner 12 tending to lift the runner and shaft 13 and thereby counterbalance their weight to a considerable degree.

By this construction any simple bearing for supporting the shaft 13 may be employed at its upper end.

By forming the housing in the two detachable parts 2 and 3, they may be separated by removing the bolts 4 to give access to the runner 12; this construction also enabling the runner 12 being placed in position when assembling the parts.

The runner housing is designed to be lowered into the well casing until it rests upon the flange where it is retained by its weight, combined with the weight of the pipe 18 attached thereto.

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

1. In a deep well pump, the combination with the well casing, of a flange on the interior thereof, a runner housing supported on said flange, a vertical shaft extending into said housing, a runner on said shaft within the housing, an intake passage formed in the housing leading from the underside thereof to the upper side of the runner, and a discharge port in the upper side of the housing opening to the well casing.

2. In a deep well pump, the combination with the well casing, of a runner housing having upper and lower sections detachably connected together, a partition on the lower portion of said housing separating the space therebeneath from the interior of the upper portion, an intake port formed in said lower portion, a passage in the upper portion communicating therewith and opening to the interior thereof through an annular port formed therein, a runner in the upper portion beneath said annular port, means for rotating said runner to draw the fluids to be pumped into the housing in a downward direction, a discharge port in said housing opening to the upper portion of the well casing, and means for supporting the housing in the casing.

3. In a deep well pump, the combination with the well casing, of a runner housing having upper and lower sections detachably connected together, a partition on the lower portion of said housing separating the space therebeneath from the interior of the upper portion, an intake port formed in said lower portion, a passage in the upper portion communicating therewith and opening to the interior thereof through an annular port formed therein, a runner in the upper portion beneath said annular port, a discharge port in the housing arranged to one side of the runner and opening to the upper portion of the well casing, a vertical, rotary shaft on which the runner is rigidly mounted, a hub on the upper portion of the housing through which said shaft extends, and a pipe detachably secured to said hub surrounding the shaft.

4. In a deep well pump, the combination with the well casing, of a runner housing having upper and lower sections detachably connected together, a partition on the lower portion of said housing separating the space therebeneath from the interior of the upper portion, an intake port formed in said lower portion, a passage in the upper portion communicating therewith and opening to the interior thereof through an annular port formed therein, a runner in the upper portion beneath said annular port, a discharge port in the housing arranged to one side of the runner and opening to the upper portion of the well casing, a vertical, rotary shaft on which the runner is rigidly mounted, a hub on the upper portion of the housing through which said shaft extends, a

pipe detachably secured to said hub surrounding the shaft, and bushings on the interior of the pipe encompassing the shaft.

5. In a deep well pump, the combination with the well casing, of a runner housing having upper and lower sections detachably connected together, a partition on the lower portion of said housing separating the space therebeneath from the interior of the upper portion, an intake port formed in said lower portion, a passage in the upper portion communicating therewith and opening to the interior thereof through an annular port formed therein, a runner in the upper portion beneath said annular port, a discharge port in the housing arranged to one side of the runner and opening to the upper portion of the well casing, a vertical, rotary shaft on which the runner is rigidly mounted, a hub on the upper portion of the housing through which said shaft extends, a pipe detachably secured to said hub surrounding the shaft, bushings on the interior of the pipe encompassing the shaft, and means attachable to the outside of the pipe for holding it in a central position within the well casing.

6. The combination with a well casing, of a vertical, incased line shaft, a pump case supported in the well casing, a runner on the shaft and disposed in a pumping chamber in the pump case, and means by which the water to be pumped is taken into the pump case below the runner and admitted to the runner chamber above the runner and thence discharged into the well casing above the pump case.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ELIJAH H. PERKINS.

Witnesses:
JOHN H. HERRING,
W. W. HEALEY.