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HYDRAULIC ROTARY PUMP.

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917,971.

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Fig. 1

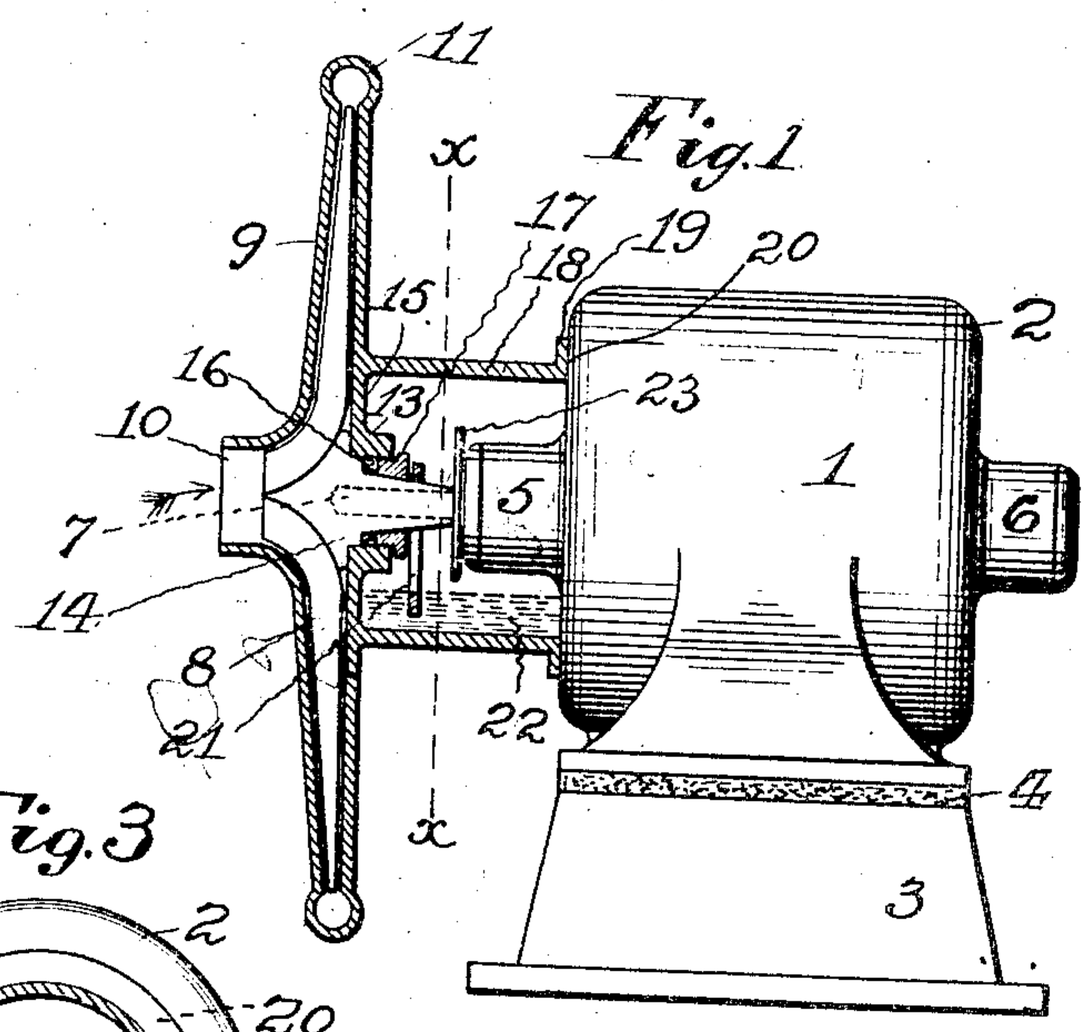

Fig. 3

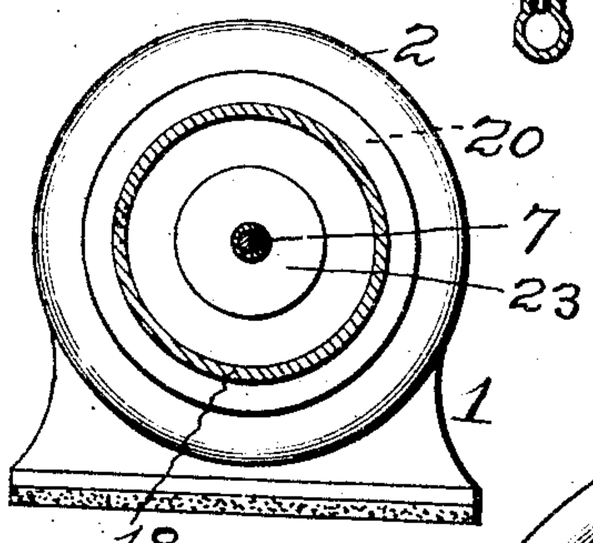

Fig. 2

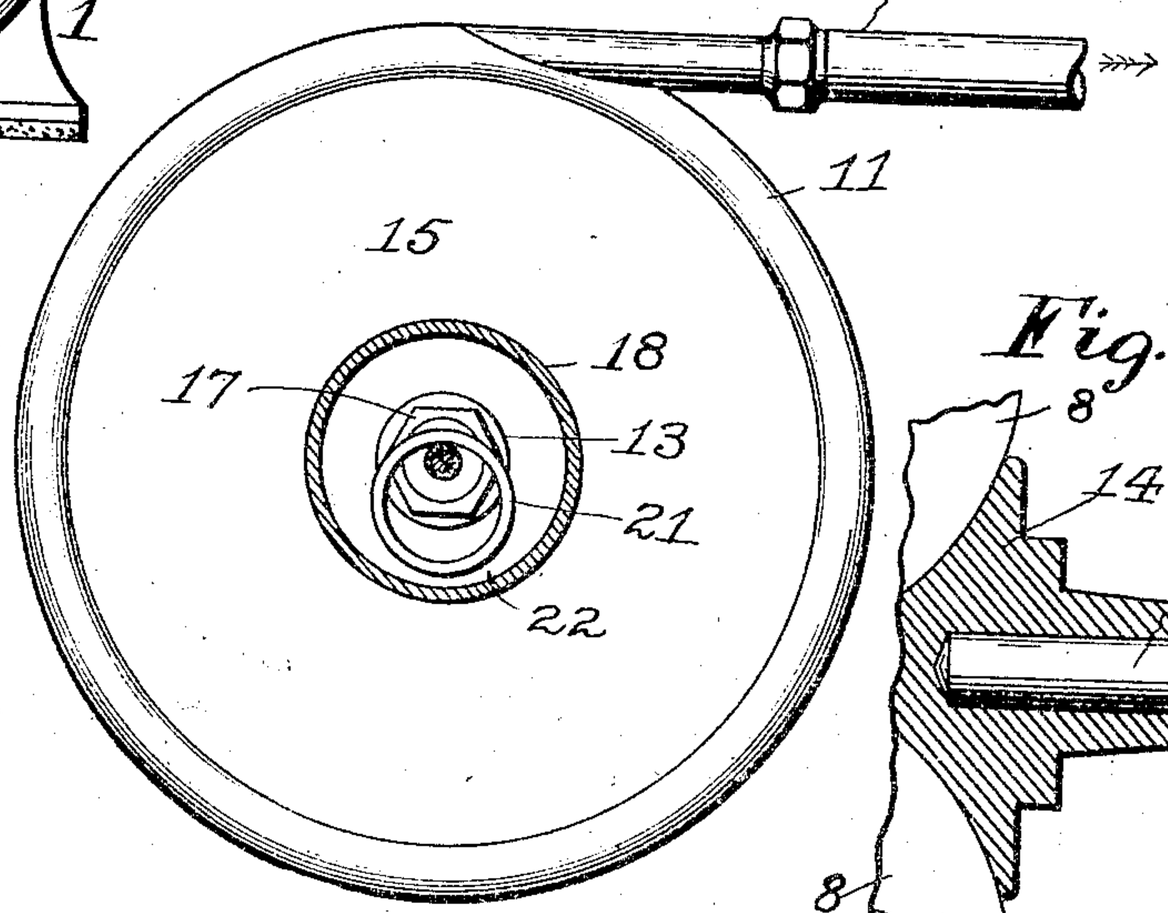

Fig. 4

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HYDRAULIC ROTARY PUMP.

No. 917,971. Specification of Letters Patent. Patented April 13, 1909.

Application filed December 14, 1905. Serial No. 291,665.

To all whom it may concern:

Be it known that I, IRA H. SPENCER, a citizen of the United States, and a resident of Hartford, in the county of Hartford and State of Connecticut, (whose post-office address is Hartford, Connecticut,) have invented certain new and useful Improvements in Hydraulic Rotary Pumps, of which the following is a full, clear, and exact description, whereby any one skilled in the art may make and use the same.

The invention relates to hydraulic pumps of the rotary or centrifugal type, and more particularly to such a device in which the rotary pump is actuated by a direct drive without appreciable loss or slip between said rotary pump parts and the motor or driving member.

The object of the invention is to provide a rotary pump in connection with a single shaft forming the drive member therefor; said shaft constituting the main shaft of the driving member.

A further object is to provide a combined pump and motor structure in which all of the parts are firmly and positively supported in connection with, what is practically, a single continuous casing.

A still further object is to arrange the pump vanes directly upon the motor shaft, in an inclosed casing removably united with a motor casing and with provision for obviating water leakage and securing positive oiling of the parts.

Referring to the drawings:—Figure 1 is a view in side elevation of a motor and attached pump; the pump being shown partially in section. Fig. 2 is a cross sectional view on the line *x x* of Fig. 1, looking toward the pump casing. Fig. 3 is an end view of the motor shaft showing the manner of joining the pump and motor casing. Fig. 4 is a detail sectional view of the hub of the pump vanes; said vanes being broken away.

Centrifugal pumps driven in various ways are so well known in the art as to hardly need detail description. In all such pumps, so far as known, the arrangement has been cumbersome and unwieldy. Ordinarily the pump shaft has had at least two bearings or a long bearing for its shaft and pump vanes; which shaft either through independent bearing supports or a cumbersome casing, has been mounted upon a substantial base independent of the motor or driving member. Necessarily from such a construction it has been difficult to provide perfect alinement between the pump shaft and the driving shaft; and, of course, with the parts even slightly out of alinement, the vibration as well as the noise induced thereby is very appreciable, particularly, as the parts run at high speeds.

It is one of the principal objects of the present invention to overcome these defects and coalesce into a single structure the motor and the various pump parts; said structure being contained within what is practically a single casing firmly mounted upon a single base.

In the accompanying drawings the numeral 1 denotes a motor having a casing 2 mounted upon a base of any desired type 3. In order to reduce vibration and consequent noise, the motor casing 2 may have interposed between it and the main base 3 a thick pad or web of mineral wool or other sound deadening and insulating material 4. As shown in the drawings the motor casing 2, has projecting from either end thereof, bearing casings 5—6 which form the support for the armature shaft 7.

The device thus far described is an ordinary electric motor. The fields of this are, of course, mounted within the casing, and it is believed such a motor needs no detail description. Of course, it is understood that a steam motor or any other suitable translator of energy, may be used.

The armature shaft 7 projects through the bearing 5, and at its outer end, has firmly secured to it the blades 8 of the pump. These blades may be of any desired form and size commonly employed in rotary pumps, and are surrounded and inclosed by a pump casing 9, having an inlet opening as at 10 and an annular discharge passage 11 from which an outlet 12 extends preferably tangential to the annular portion 11. The pump casing 9 is of somewhat peculiar shape, and is provided with a cen-

tral hub 13 which forms a metallic packing and bearing for the hub 14, upon which the vanes are mounted and which in turn is secured to the armature shaft and extends within the hub 13. If desired this hub may be formed with a reduced sleeve surrounding the motor shaft and extending clear through to the motor bearing. This will provide against end movement of the parts with relation to each other and avoid knocking of the rotary parts within the pump casing. The hub 13 is bored out and has a diameter considerably greater than the armature shaft. It also extends some distance from the face 15 of the pump casing, and provides a stuffing or packing box for the armature shaft to prevent back leakage of fluid along said shaft. As shown herein, the space between the end of the hub 14 and the hub 13, is filled with a packing 16 adjustably held in place by a packing ring 17 screwed within the hub 13.

The casing 9 has extending from its rear face 15, a tube-like projection 18 provided at its outer end with a flange 19, the outer end of which is nicely finished to surface and fits against the finished surface 20 upon the motor casing 2, surrounding the bearing 5 and parts intermediate said bearing and the pump vanes. The extension 18 is of such a length that a space is left between the end of the hub 13 and the end of the bearing box 5; and in this space and hanging upon the shaft 7 is an oil ring 21. This oil ring is of sufficient diameter to extend nearly to the bottom of the oil well 22 formed by the projection 18.

Of course, it is understood that the motor bearing 5 is suitably oiled and the shaft 7, through the oil ring 21, is well lubricated at the stuffing box. To provide against back leakage of water or other fluid, from the pump casing to the motor shaft 5, a shield or disk 23 is provided at the end of the motor bearing 5 and secured to the shaft 7.

Obviously from the above described arrangement of parts, the pump vanes and casing are perfectly alined with reference to the motor shaft 7, when said pump casing is once properly positioned with reference to the motor casing; and thus there is provided a structure in which all of the operating parts occupy the least possible space within what is practically a single casing. The advantages of such a structure are obvious at a glance. It will be readily understood that the motor casing may be finished at the point 20 concentric with the motor shaft, and with the proper finishing of the flange 9, the parts will fit together with absolute precision, giving perfect alinement and noiseless and easy running qualities. A still further advantage of the construction resides in its very condensed form. The extended hub or tube as the case may be which lies between the vanes of the pump and the disk adjacent to the motor bearing, has a very perceptible taper, and during rapid rotation the oil upon the sleeve will be thrown to its high point against the stuffing box. This aids in preventing leakage of water to the motor bearing.

Of course, it is understood that the exact details of construction may be varied to a considerable degree, and that the exact form of motor casing and pump casing herein shown, is not absolutely essential to the invention which contemplates the formation and arrangement of a rotary pump casing in substantial continuation of and supported by a motor casing.

What I do claim as my invention and desire to secure by Letters Patent is:—

1. In combination, in a rotary hydraulic pump, a motor having a complete inclosing casing and a motor shaft extending therefrom, pump vanes having a hub secured directly to the motor shaft and a pump casing surrounding and inclosing said pump vanes and hub and having a tubular extension of comparatively small diameter secured to the motor casing and forming an inclosed oil well about the shaft of the motor and hub of the pump.

2. In combination, in a rotary hydraulic pump, a motor having a casing and with a shaft projecting beyond the complete inclosing casing, pump vanes having a hub secured to the end of said shaft, a pump casing surrounding said vanes and hub and having a tubular projecting portion encircling the shaft and secured to the motor casing and forming an inclosed oil well, a central hub upon the pump casing surrounding the motor shaft and projecting into the oil well casing, a stuffing box arranged in said hub and an oil ring intermediate said stuffing box and the bearing for the motor shaft.

3. In combination in a rotary hydraulic pump, a motor having a complete inclosing casing, a shaft having bearings in said casing and projecting therefrom, a pump casing provided with a tubular extension concentrically arranged with reference to said shaft and of comparatively small diameter, said extension forming an inclosed oil well, pump vanes mounted within the pump casing and having a hub projecting therefrom into the oil well casing and surrounding the motor shaft, a stuffing box appurtenant to said hub and pump casing, a disk secured to the shaft adjacent to the motor casing and an oil ring intermediate the stuffing box and disk substantially as described.

4. In combination, in a rotary hydraulic pump, a motor having a complete inclosing casing and a motor shaft extending there-

from, pump vanes secured to said motor shaft, a tapered hub extending from the pump vanes about the motor shaft, a pump casing having a tubular extension of comparatively small diameter arranged in continuation of said motor casing and forming an oil well surrounding and inclosing the motor shaft and tapered hub and a floating ring upon the tapered hub.

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