A. G. JOHNSON.

ROTARY PUMP.

APPLICATION FILED AUG. 23, 1915.

1,197,637.

Patented Sept. 12, 1916.

2 SHEETS—SHEET 1.

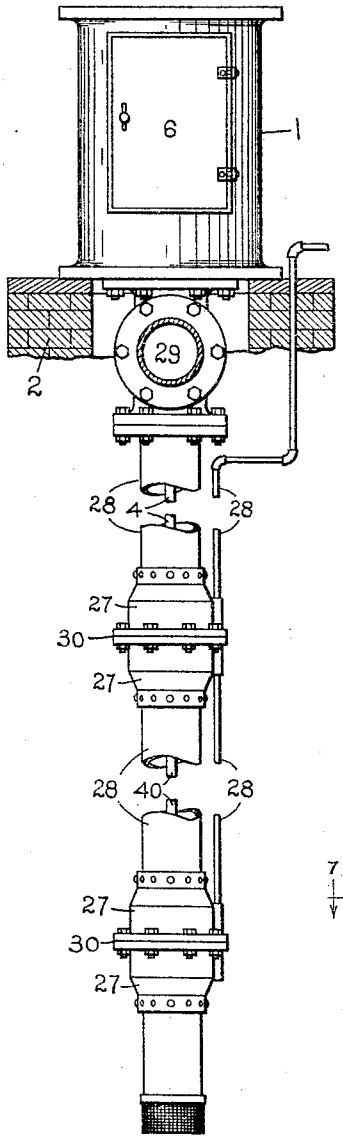


Fig. 1.

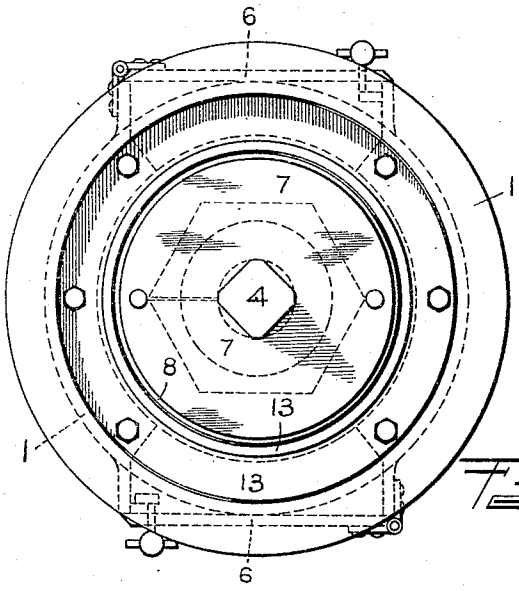


Fig. 2.

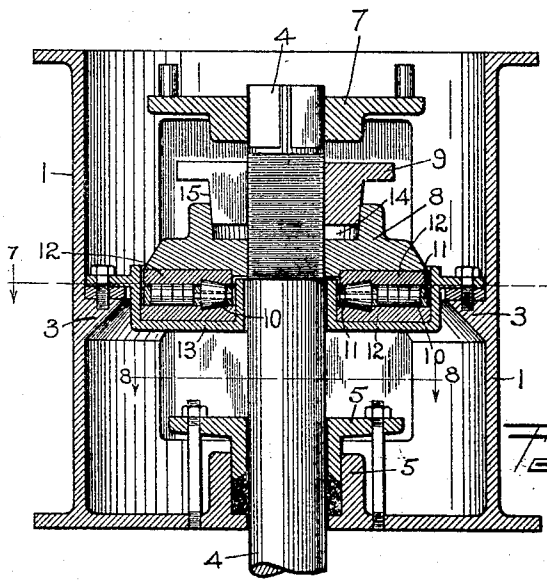


Fig. 3.

Witness

A. W. Jamieson.

Inventor

Andrew G. Johnson,

By Millard Eddy,

Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

A. G. JOHNSON.

ROTARY PUMP.

APPLICATION FILED AUG. 23, 1915.

1,197,637.

Patented Sept. 12, 1916.

2 SHEETS—SHEET 2.

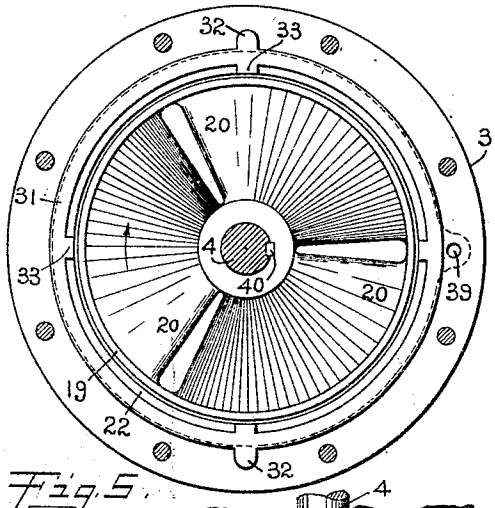


Fig. 5.

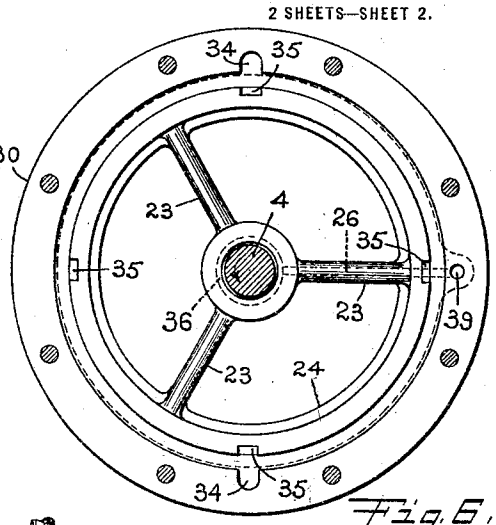


Fig. 6.

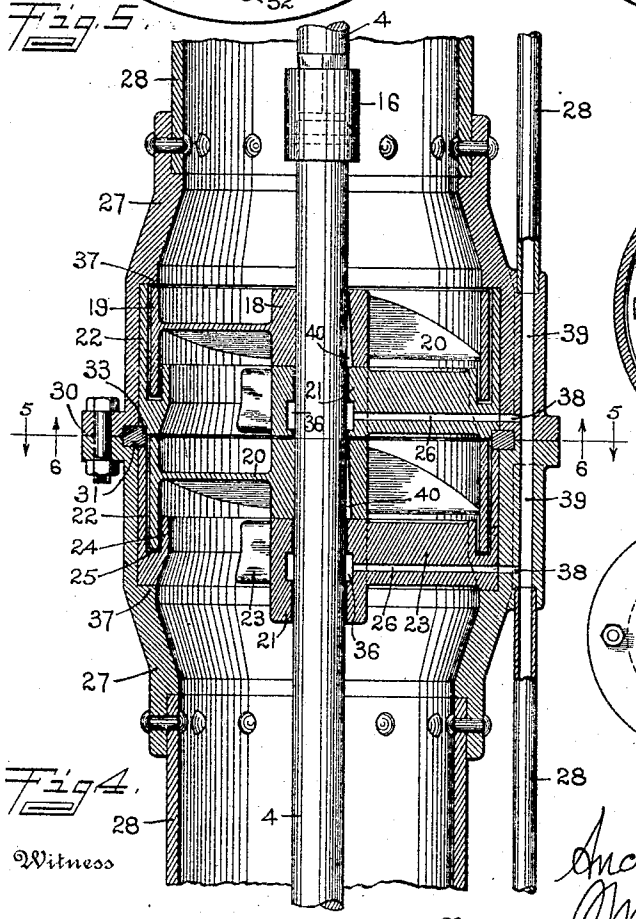


Fig. 4.

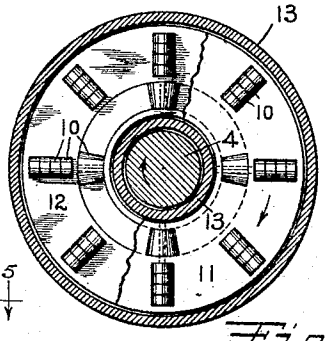


Fig. 7.

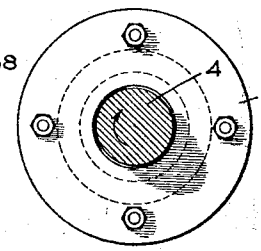


Fig. 8.

Witness

A. W. Jamieson

By

Inventor

Andrew G. Johnson,

Willard Eddy,

Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ANDREW G. JOHNSON, OF LINCOLN, NEBRASKA.

ROTARY PUMP.

1,197,637. Specification of Letters Patent. Patented Sept. 12, 1916.

Application filed August 23, 1915. Serial No. 47,908.

To all whom it may concern:

Be it known that I, ANDREW G. JOHNSON, a citizen of the United States, residing in the city of Lincoln, in the county of Lancaster and State of Nebraska, have invented certain new and useful Improvements in Rotary Pumps, and have described the same in the following specification, illustrated by the accompanying drawings.

My invention relates to that class of rotary pumps which individually comprise a tubular casing, commonly suspended in a well, a rotary line shaft coaxial with the casing, a plurality of rotary propellers carried by the shaft, and a plurality of liners for directing the water current to the propellers.

It is the object of the invention to avoid unnecessary duplication of parts in a pump of this kind; to provide water lubrication for the propellers; to avoid fouling the pumped water with lubricating oil; to cleanse the submerged bearings of the line shaft by flushing; to facilitate the operation of the pump; and in general to increase the operative convenience and efficiency of pumps of the specified class. To accomplish this object I incorporate in my improved pump, as parts thereof, a driving-head of special construction, a plurality of two-part boxes, a plurality of separate and removable liners having annular internal water channels and grouped in pairs in the boxes respectively; a plurality of propellers, similarly grouped and having rims running in these channels respectively; a single annular key between the casing and each pair of liners; and an external supply pipe with connecting passages in the runners, for conducting water under pressure into the submerged bearings of the line shaft.

In the accompanying drawings, illustrating the best manner in which I have contemplated applying the principles of the invention, Figure 1 is a side elevation of a pump which is constructed in accordance with these principles, and supported in working position by brickwork at the mouth of a well. Fig. 2 is a plan of the driving-head of the same pump. Fig. 3 is a vertical axial section of the same driving head. Fig. 4 is an axial section of a specimen portion of Fig. 1. Fig. 5 is a transverse section on the section line 5—5 of Fig. 4. Fig. 6 is a like section on the same line 6—6. Figs. 7 and 8 are transverse sections on the section lines 7—7 and 8—8 of Fig. 3 respectively.

The driving head for the support and operation of the pump is shown in Figs. 1, 2, 3, 7 and 8 of these drawings. It has a cylindrical casing 1, standing on the brickwork 2, and covering the mouth of the well in which the pump is dependently inserted. This casing has an internal annular lug 3, a central hole through the bottom for the line shaft 4, an internal stuffing-box with the re-entrant wall 5, guarding this hole, and two large opposite outside doors 6, rendering the head accessible. The head comprises the annular yoke 7, the principal nut 8 and the jam nut 9, on the line shaft, the anti-friction rollers 10, the spacing plate 11, the bearing plates 12, and the annular trough 13. The yoke 7, fitted to the squared top of the line shaft, is adapted to engage operatively a rotary driving motor not shown in the drawings. The principal nut 8 on the same shaft, carries on its broad back a conically tapering shallow socket 14; while the jam nut 9, split radially from the middle to one side, has a similarly tapering front projection 15, compressible in this socket 14. The anti-friction rollers 10 are spaced and seated in suitable openings through the annular spacing-plate 11, and between the upper and the lower bearing plates 12; these upper plates being fitted to the underside of the nut 8. The horizontally disposed trough 13, encircling the line shaft, has a peripheral flange bolted to the lug 3, and contains the anti-friction rollers, the spacing-plate, the bearing-plates, and a quantity of lubricating oil in which the rollers are submerged. From this head the remaining parts of the pump are suspended; the rotary parts being carried by the line shaft, and the stationary parts by the described casing.

The line shaft, composed of abutting shaft sections 4 united by the couplings 16, carries, fixed thereto in each stage of the pump, by the tapering keys 40, a pair of duplicate runners, the propellers 18, having severally the central hub 18· the broad cylindrical rim 19, and the spirally arranged sectoral blades 20 connecting the rim with the hub; and turns in the liners 21. Each of these liners comprises a central hub denoted by the same numeral 21, the cylindrical shell 22, and the intermediate radially disposed and vertically partitioning blades 23, and has be-

tween the outer wall 22 of that shell and the inner derivative wall 24 of the same, the interior annular channel 25 opening upward to accommodate the contained propeller running loosely therein. Each of the hubs 21 has an interior annular channel, the water chamber 26 opening on the line shaft, while each of the liners has the interior radial water passage 26, extending from this chamber to the outside of the liner.

The tubular casing of the pump comprising a plurality of cylindrical boxes 27, interconnected by the pipe sections 28, is bolted to the underside of the head casing in a co-axial position, and has at the top the flanged orifice 29 for discharging the water pumped. Each of the boxes 27 consists of two duplicate and abutting half-boxes, which are denoted by the same numerals 27 and are united by the flange joint 20. In the half-boxes respectively of each box 27 are seated two of the described liners 21 having the shells 22, held in juxtaposition between the annular shoulders 37 formed inside the boxes. These two liners are held non-rotatably in this position by the single annular key 31, which breaks joints between the half-boxes, and has the peripheral and the internal lugs 32 and 33, occupying respectively the inside sockets 34 in the mutually contacting ends of the half-boxes and the outside sockets 35 in the rims 19 of both liners. For the purpose of internally flushing the hubs 21, the conduit 39 is formed on one side wall of each of the boxes 27; and these conduits, disposed in vertical alinement, and serially connected by the pipe sections 28 with each other and with some suitable source of water supply, not shown, are connected with the water passages 26 by the radial holes 38, which perforate the sides of the boxes and register with these passages.

By the described construction the above stated object of the invention is advantageously accomplished in all its branches. The grouping of the propellers and the liners in pairs promotes simplicity of construction and avoids unnecessary multiplication of the boxes in which they are contained. The separability of the two halves of each box, renders their contents accessible for renewal and substitution. The annular key between the propellers prevents leakage at the flange joint between the half boxes. The oil trough and the stuffing-box in the casing of the driving-head, prevent all leakage of lubricating oil into the casing below.

I claim as my invention:

1. A pump of the specified class, comprising a pair of tubular mutually abutting and separably united half boxes co-axial with the line shaft; a pair of removable liners which have hub bearings for the line shaft, and radial water partitions, and are non-rotatably seated in the half boxes respectively; and a pair of propellers having water blades and keyed to the shaft within the half boxes respectively.

2. A pump of the specified class, comprising a pair of tubular and mutually abutting half-boxes co-axial with the line shaft; a pair of removable liners which have cylindrical shells, central bearings for the line shaft, vertical water partitions, and annular internal water channels, and are seated in the half boxes respectively; and a pair of propellers carried by the shaft and having peripheral shells running in the water channels.

3. A pump of the specified class, comprising a tubular casing, stationary liners therein having hub bearings for the line shaft, annular water chambers in the bearings, an external conduit for supplying of water under pressure, and radial passages formed in the liners and communicating with the water passages and the external conduit.

4. A pump of the specified class, comprising a tubular casing having lateral inlet ports, liners seated in the casing and having hub bearings for the line shaft, an external conduit for the supply of water under pressure to the inlet ports, and passages formed in the liners for conducting water from the ports to the inside of the bearings for flushing.

Witness my signature this 21st day of August, 1915.

ANDREW G. JOHNSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."