(No Model.) 3 Sheets—Sheet 1.

E. H. GOLLINGS.

ROTARY PUMP.

No. 448,335. Patented Mar. 17, 1891.

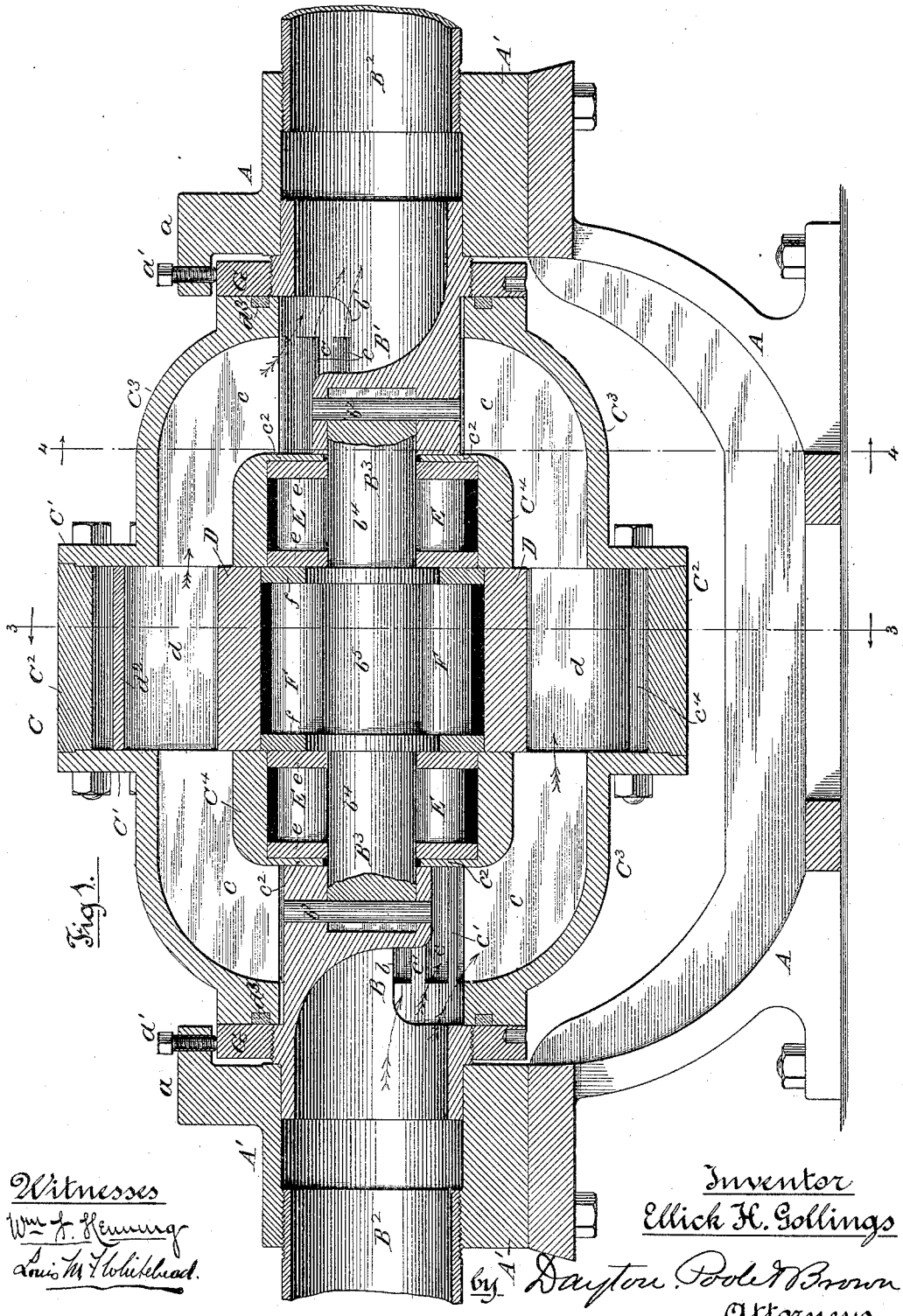

Fig. 1.

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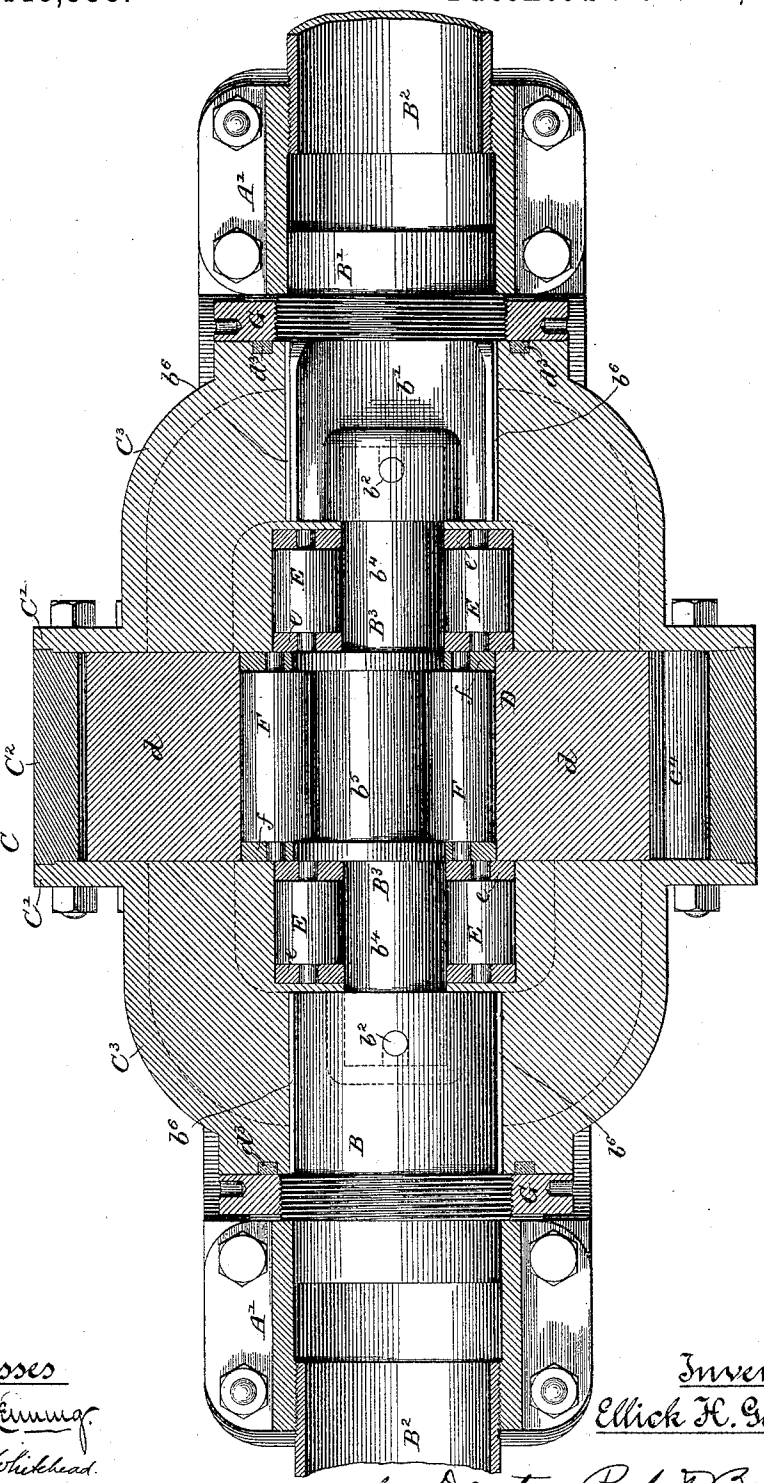
Fig 2.



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(No Model.) 3 Sheets—Sheet 3.

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Fig 4.

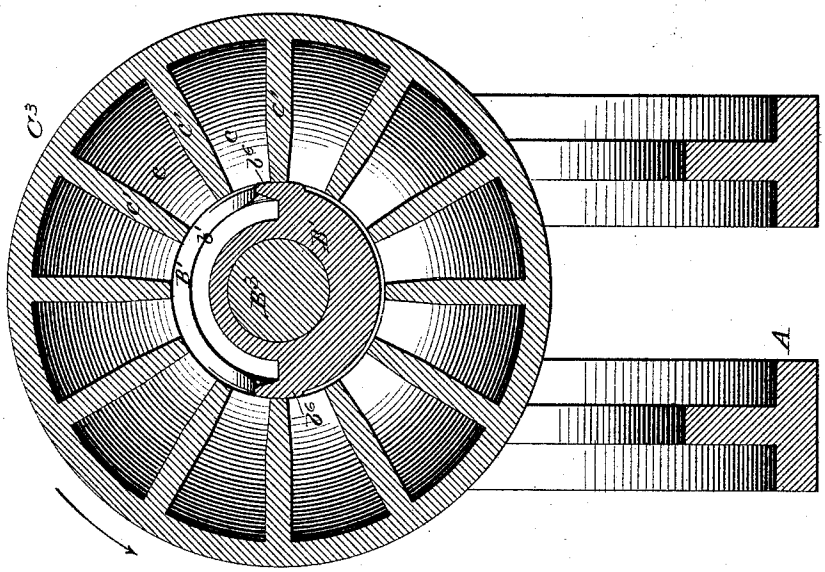
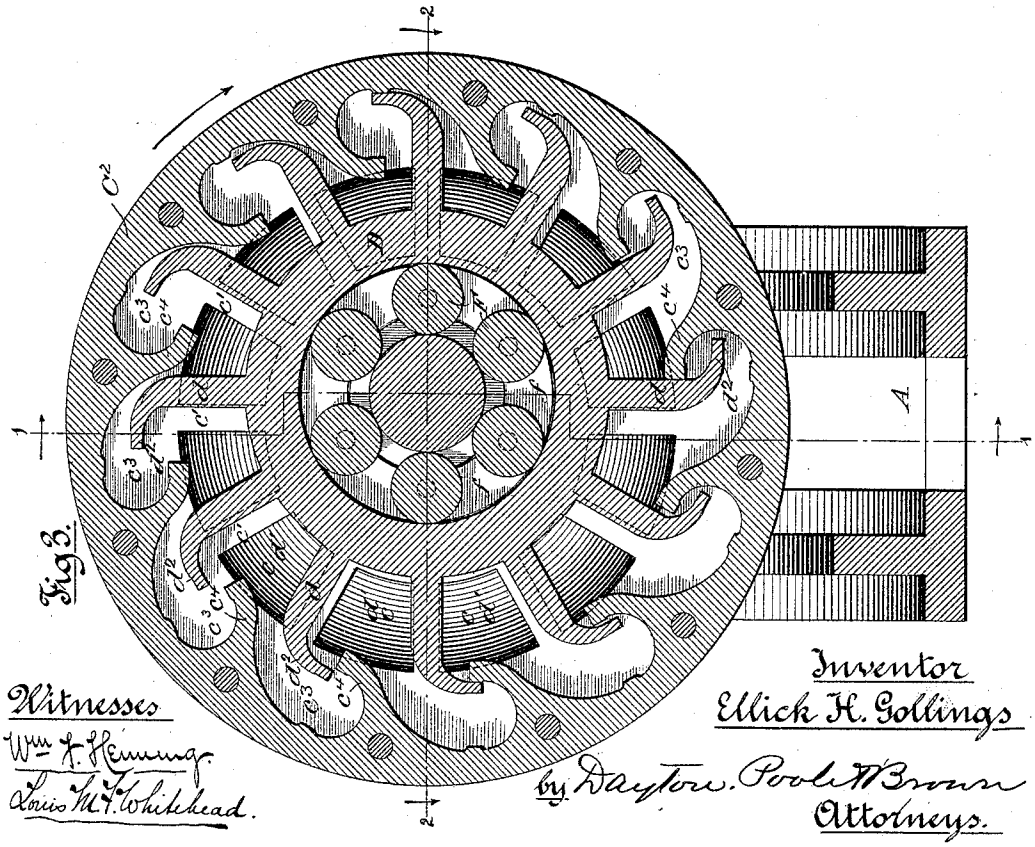


Fig 3.



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UNITED STATES PATENT OFFICE.

ELLICK H. GOLLINGS, OF LEWISTON, IDAHO, ASSIGNOR TO THE GOLLINGS BI-CENTRIC PUMP COMPANY, OF CHICAGO, ILLINOIS.

ROTARY PUMP.

SPECIFICATION forming part of Letters Patent No. 448,335, dated March 17, 1891.

Application filed June 22, 1889. Renewed January 8, 1891. Serial No. 377,171. (No model.)

To all whom it may concern:

Be it known that I, ELLICK H. GOLLINGS, of Lewiston, in the county of Nez Perce and Territory of Idaho, have invented certain new and useful Improvements in Rotary Pumps; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to that class of rotary pumps (illustrated in a prior application for Letters Patent of the United States, Serial No. 301,675, filed by me March 1, 1889) in which a concentric rotating shell contains and rotates a radially-chambered eccentrically-mounted wheel, and in which non-rotating axial pipes respectively supply water to and discharge water from the interior of the shell and eccentric-wheel as these are simultaneously rotated. In said prior application the walls or partitions which separate the radial chambers of the eccentrically-mounted wheel were illustrated as having extensions or vanes flexibly connected therewith, the free ends of which vanes were held constantly in contact with the inner periphery of the surrounding shell, thus affording alternately expanding and contracting water-spaces.

It is an object of the present invention to avoid the use of the hinged vanes, and to thereby simplify the apparatus, lessen the cost of its construction, and enhance its durability. This and other features of improvement are illustrated in one desirable form in the accompanying drawings, in which—

Figure 1 is a longitudinal section in the indirect line 1 1 of Fig. 3. Fig. 2 is a horizontal section in the line 2 2 of Fig. 3. Fig. 3 is a transverse section in the line 3 3 of Fig. 1. Fig. 4 is a transverse section in the line 4 4 of Fig. 1.

Describing the construction here illustrated as one embodiment of my invention, A represents a base having uprights A′ A′ at its opposite ends. Within the uprights A′ A′ are secured the hollow axial non-rotating supports B B′ and also pipes B^3 B^2, forming external continuations of the passages of said tubular supports, one for the admission and the other for the discharge of water or other liquid to be pumped by the apparatus. The hollow support B is provided with a lateral opening or outlet *b*, (shown in the present instance as in the under side thereof,) and the support B′ has a similar opening *b′* on the opposite side from the opening *b* or on the upper side thereof.

B^3 is a shaft connected with and upheld by the tubular supports B B′, being let into the partially-closed ends of the latter, and there secured against rotation by means of pins or keys b^2. The shaft B^3 is composed of three portions b^4 b^4 and b^5. The outer portions b^4 b^4 are concentric with the tubular supports B and B′; but the central portion b^5 is eccentric thereto.

C is the outer rotating shell of the pump, consisting of the two similar heads or end plates C′ C′ and the interposed ring C^2. This shell is rotatably mounted on the concentric portions b^4 b^4 of the shaft B^3. Between the heads C′ and upon the central eccentric portion of the shaft b^5 is rotatably mounted the wheel D, provided with radial evenly-spaced wings or blades *d*, affording intermediate outwardly and laterally open chambers *d′*.

Each of the heads C′ of the shell C has a hub C^3 extending to or beyond the outer extremity of the adjacent set of openings *b* or *b′* of the axial support embraced thereby, and within each of said hubs are a series of chambers or passages *c c*, separated by longitudinally-arranged partitions *c′ c′*, which correspond in number with the blades *d d* upon the wheel D. The passages *c* give communication between the interior of the axial supports B B′ and the spaces *d′* of the said wheel D. Opposite the concentric portion b^4 of the shaft B^3 the partitions *c′* of the hub are connected with each other by a ring C^4, between which and the shaft B^3 are interposed a series of anti-friction rollers E, journaled at their ends in suitable spacing-rings *e e*. Each of the rings C^4 is shown provided with an inwardly-directed annular flange c^2, which extends nearly to the shaft B^3 between the end of the adjacent axial support and the outer ring *e* of the contiguous roller-bearing and in close contact with the end of the adjacent

axial support. Within the hub of the wheel D and embracing the eccentric b^5 of the shaft B^3 are placed another series of anti-friction rollers F, also journaled in spacing-rings *f f*. The eccentric b^5 has its throw in a plane at right angles to the plane of the openings *b b'* of the tubular supports B and B', and at each side of its opening *b* or *b'* each of said supports B B' is provided with longitudinal ribs b^6, as shown in Figs. 2 and 4. Said ribs closely proximate or bear against the edges of the partition *c'* within the hub C^3, and each is of such width that when one partition passes the rib the next one following will have reached it. As a result of this construction only those chambers *c* within the hub C^3 which are on the same side as the opening *b* or *b'* are in communication with the interior of the corresponding support B or B'. These ribs b^6 are in the same plane as that of the throw of the eccentric.

Against the ends of the hubs C^3 bear adjustable rings G, which are shown to be screw-threaded upon the supports B B', and the ends of the hubs are shown as having annular packing-rings d^3 let into their faces which bear against said adjustable rings G. A bracket or overhanging lug *a* on each of the uprights A' affords a seat for the set-screw *a'*, by which the adjacent ring G may be secured in any position to which it may be adjusted.

The peripheral ring C^2 of the shell C is provided with a series of undercut recesses c^3, corresponding in number with the blades *d* of the eccentrically-mounted wheel D, said recesses being separated by transverse overhanging flanges c^4. The extreme end faces of these flanges are fitted to bear (when in proper position to do so) against the radial faces of the said blades *d*, such contact being shown at the bottom of Fig. 3. The blades *d* have end flanges or offsets d^2, which enter the recesses c^3, and are directed toward the concavities of said recesses which are overhung by the flanges c^4. The under or inner surfaces of said offsets d^2 of the blades are fitted to bear against the outer surfaces of the flanges c^4 near their extremities, as shown at the left in Fig. 3, and the outer surfaces of said offsets d^2 of the blades are also fitted to bear against the bottoms of the recesses, as indicated at the right in Fig. 3.

The simultaneous rotation of the eccentrically-mounted wheel D with the shell C is produced by contact of that one of the flanges c^4 of the shell which is most remote from the plane of greatest eccentricity or, as said plane is shown in the drawings to be horizontal, by contact of the lowermost of the flanges c^4 of said shell with the corresponding blade *d* of the wheel, the contact being continued through a short arc and constantly shifting from one blade to the next in such simultaneous rotation of shell and wheel.

The contacts shown at the left and right in Fig. 3 are manifestly produced by the eccentric b^5, on which the wheel D is supported. The blades having such contact are in the same plane with the ribs b^6, and are also coincident with partitions *c'* in the hubs C^3, from which it follows that the chambers in the lower half of the shell and wheel (being rotated in the direction of the arrows, Fig. 3) are severally enlarged as they pass from the right to the left, and that they are correspondingly contracted in the upper half of the wheel and shell as they move from the left to the right. The chambers in the lower half of the shell and wheel therefore take water from the opening *b* of the tubular support B, and the chambers in the upper half of said shell and wheel force the water into the opening *b'* of the tubular support B'.

It is manifest that the above-described division of the chambers will be in the plane of the throw of the eccentric, and as this eccentric does not rotate, but is fixed in a plane at right angles to the plane of the opposite openings *b b'* and coincident with that of the ribs b^6, the action will always be that which is above set forth.

It will be understood that the improvement relating to the conformation of the blades *d* of the wheel and the recesses c^3 and flanges c^4 of the shell may be employed in the absence of the improvement relating to the roller-bearings, and vice versa. Whether the anti-friction rollers be employed or not, it is considered an advantage to provide bearings for the rotating parts which are of less diameter than that of the axial supports B B', since the latter are necessarily of considerable size in order to afford sufficiently large water-passages through them. The construction shown, in which said supports B and B' are of cast metal and the journal-shaft B^3 is of steel or wrought metal and much smaller than the said supports, secures the advantages desired. In the use of the relatively small journal-shaft B^3, together with the anti-friction roller-bearings, the utmost ease in running is attained.

It is manifest that the modification shown in my aforesaid application for patent, in which the sides of the water chambers or spaces *d'* of the wheel D are closed and the water is admitted and discharged at or near the axis, may be adopted in connection with the construction of the ring C^2 and blades *d* here illustrated. It is also plain that other changes in details of construction may be made without departing from the principle which underlies my invention, and I therefore do not wish to be restricted to the precise forms shown.

Rotation of the shell and its contained wheel may be produced by a belt trained over the ring C as a pulley or in any other of many possible ways.

I claim as my invention—

1. In a rotary pump, the combination, with a rotating shell having a series of recesses in its inner periphery overhung in part by transverse flanges, of a chambered and eccentric-

ally-mounted wheel within the shell, having blades which project into the recesses of the shell and engage the latter, substantially as described.

2. The combination, in a rotary pump, of a non-rotating shaft having an eccentric portion, a rotating shell mounted on the concentric portion of said shaft and having a series of recesses in its inner periphery overhung in part by transverse flanges, and a peripherally-chambered wheel mounted on the eccentric portion of the shaft within the shell and having blades which project into the recesses of the shell, the blades and the shell successively engaging at opposite sides of said shell to divide the space between the shell and wheel into receiving and discharging chambers, and the said blades successively having lateral bearing against the flanges of the shell at a point intermediate to the points of divisional contact, whereby motion is given by one of said rotating parts to the other.

3. The combination of the fixed hollow supports B and B′, provided with opposite lateral openings, the non-rotating journal-shaft B^3, of less diameter than said supports, the shell having chambered hubs covering the lateral openings of the supports, but journaled upon the concentric portions of the shaft B^3, and the inclosed and chambered wheel D, rotatably mounted upon the central eccentric portion of said shaft B^3, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

ELLICK H. GOLLINGS.

Witnesses:
M. E. DAYTON,
TAYLOR E. BROWN.