

No. 633,474.

Patented Sept. 19, 1899.

R. J. NORTHAM.  
ROTARY PUMP.

(Application filed July 25, 1898.)

(No Model.)

2 Sheets—Sheet 1.

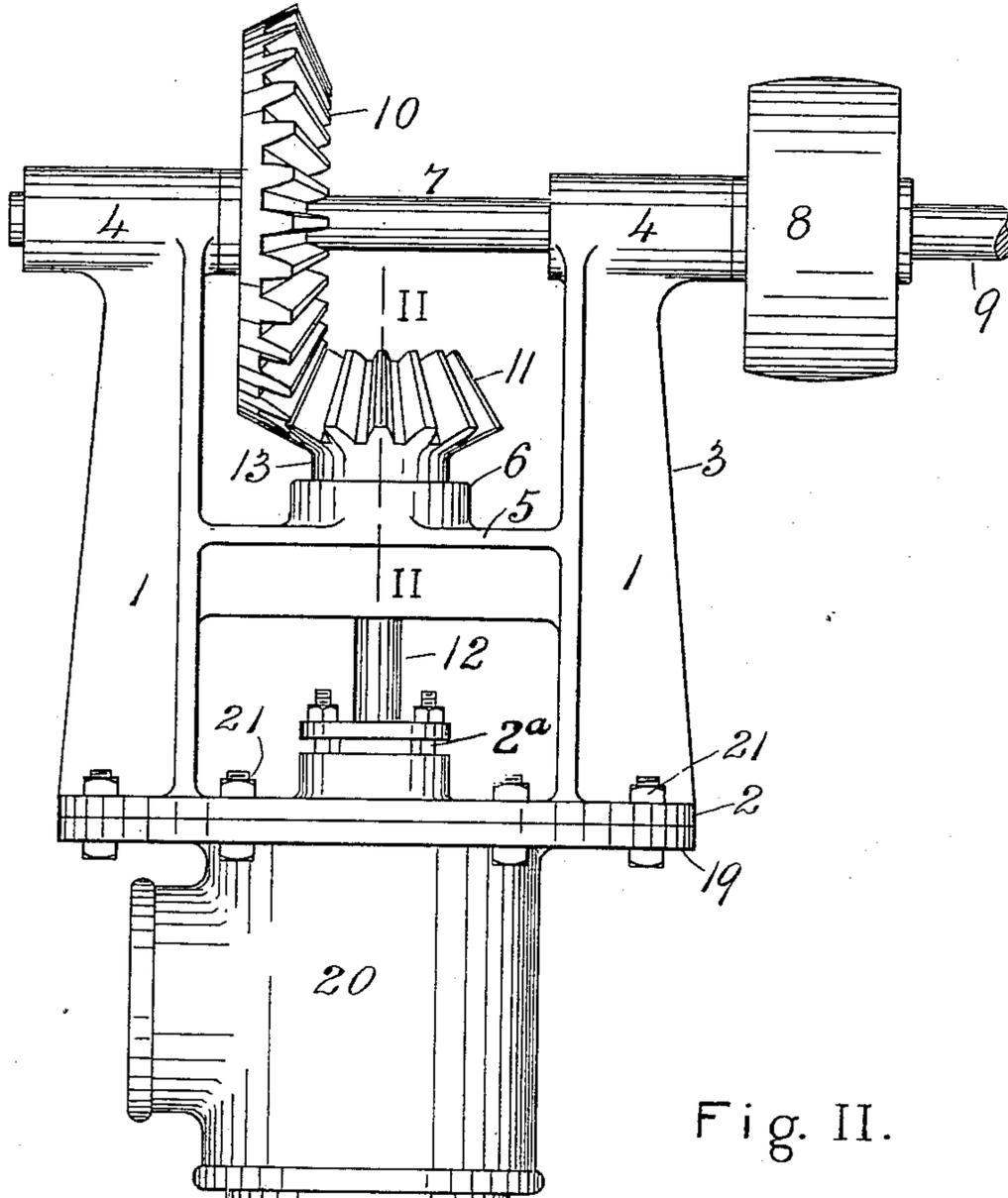


Fig. II.

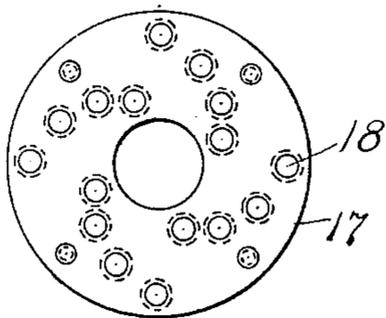
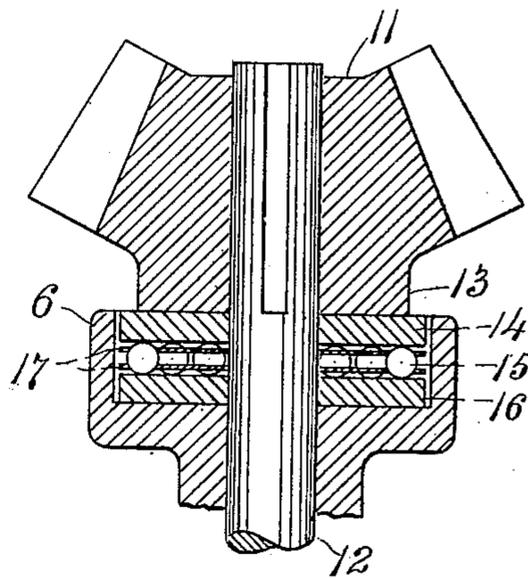


Fig. III.

Fig. I.



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2 Sheets—Sheet 2.

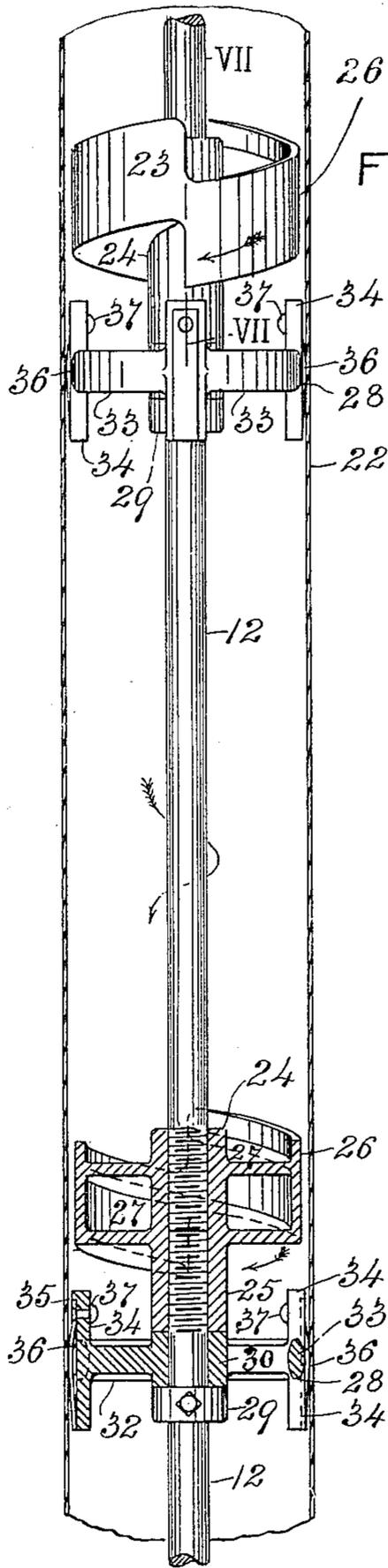


Fig. IV.

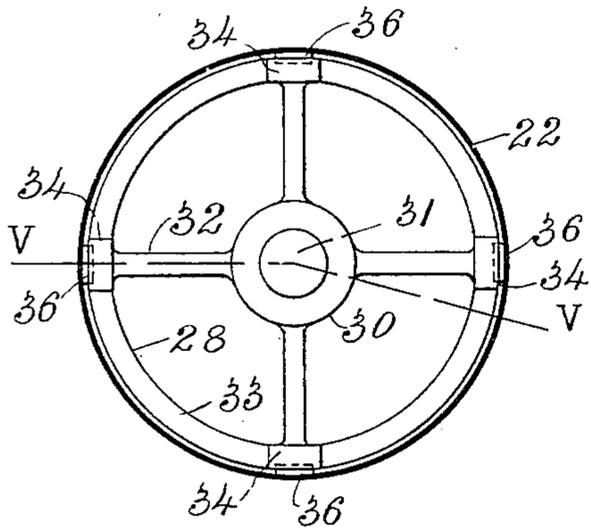


Fig. VI.

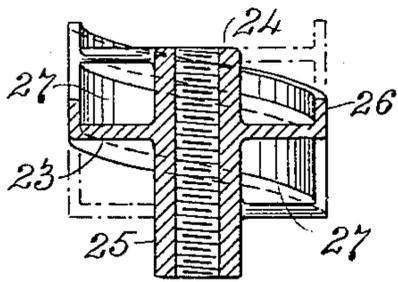
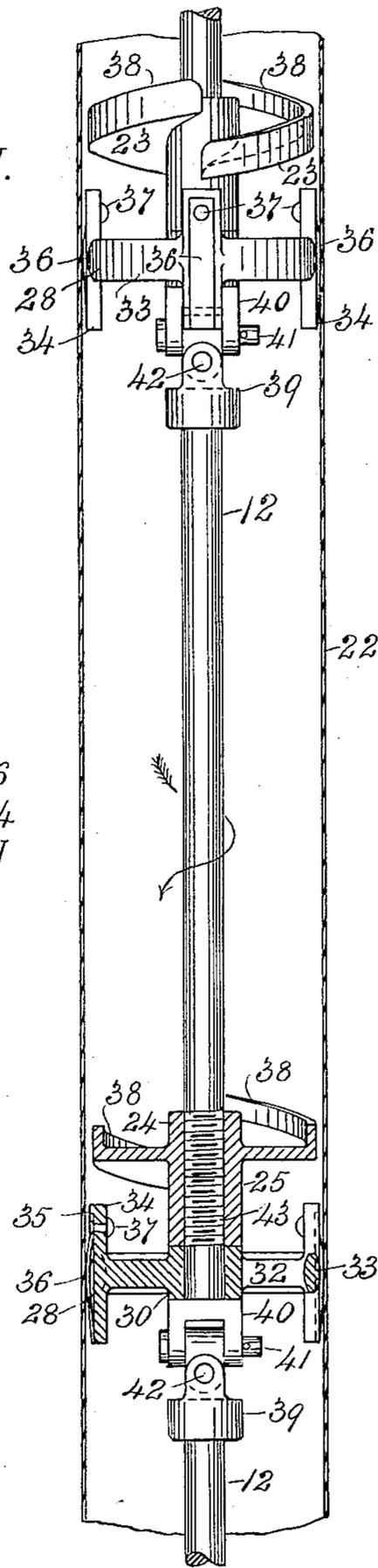


Fig. VII.

Fig. V.



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# UNITED STATES PATENT OFFICE.

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## ROTARY PUMP.

SPECIFICATION forming part of Letters Patent No. 633,474, dated September 19, 1899.

Application filed July 25, 1898. Serial No. 686,867. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT J. NORTHAM, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Rotary Pumps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to improvements in rotary pumps, more especially the means of driving the pump-shaft, the screw-blades for raising the water, and the guides for regulating and bracing the pump-shaft, also the peculiar construction of shaft adapted to a well in which the casing may be bent; and my invention consists in features of novelty hereinafter described and claimed.

Figure I is a front elevation of my improved pump-head, showing a fragment of the casing connected therewith. Fig. II is a vertical section taken on line II II, Fig. I. Fig. III is a top view of one of the spacing-plates for the ball-bearings. Fig. IV is a vertical section of a well-casing, showing my improved screw-blades on the pump-shaft and the guides for holding the screw-blades from contact with the inner side of the well-casing, the screw-blades and guides being shown in elevation and also in section. Fig. V is a vertical section of a well-casing, showing a modified form of screw-blade, the spacing-guides, and a modified form of pump-shaft, the screw-blades and guides being shown in side elevation and vertical section, the vertical section of the guide being taken on line V V, Fig. VI. Fig. VI is a plan view of my improved guide. Fig. VII is a vertical section of the screw-blade, taken on line VII VII, Fig. IV.

Referring to the drawings, 1 represents my improved pump-head, consisting of a base-plate 2 and vertical posts 3, having journal-bearings 4 located at their upper ends and having a cross-frame 5, with a hub 6.

7 represents an operating-shaft extending in a horizontal direction, to which is secured a driving-pulley 8. The shaft 7 may be extended, as shown at 9, in order that more than one pump may be operated by the same shaft. The shaft 7 is journaled in the bearings 4 and is provided with a beveled gear-wheel 10, the

beveled gear-wheel 10 meshing with a beveled gear-wheel 11 on the upper end of the pump-shaft 12. On the lower end of the gear-wheel 11 is a collar 13, resting upon a bearing-plate 14, the bearing-plate 14 resting on ball-bearings 15, which in turn rest upon a plate 16. The ball-bearings are spaced apart by means of upper and lower spacing-plates 17, said spacing-plates being provided with a series of circular apertures 18 of less diameter than the ball-bearings and through which the balls partially extend, said balls being thus held a proper distance from each other. The bearing-plates 14 16, the ball-bearings, and the spacing-plates are all inclosed by the hub 6 on the cross-frame 5.

2<sup>a</sup> represents a packing-gland supported by the plate 2, said plate 2 resting upon a plate 19, which is an integral part of a T-coupling 20.

21 represents bolts for securing the plates 2 and 19 to each other.

22 represents a well-casing, to which the T-coupling 20 is secured.

23 represents my improved screw-blades for raising water or other liquid. The blades 23 have a central hub 24, said hub being threaded on its inner side and forming a coupling for the meeting sections of the pump-shaft 12, which screw into said hub. The hub 24 is elongated, as shown at 25, on the under side of the screw-blades, said hub spacing the guides the proper distance from the screw-blades. There may be any number of convolutions of the screw-blade. I have shown two convolutions in my drawings.

26 represents a peripheral shell on the outer ends of the screw-blades, the result being that the passage-way of the water as it passes through the blades is entirely inclosed, thus preventing the water from passing downward over the outer edge of the blades when the pump is in operation.

The provision of the peripheral shell 26 has another advantage in forming a broad surface contiguous to the casing 22 and which prevents the outer edges of the blades from cutting into the casing 22 when the guides become worn or displaced.

27 represents the passage-way through which the water travels as the pump is rotated. In order that the screw-blades may not come in contact with the sides of the well-casing, I

provide a guide 28, loosely mounted upon the shaft 12 and supported by a set collar 29. 30 represents a hub in said guides having a central passage 31, through which the pumping-  
 5 shaft extends, having radiating spokes or arms 32 and a peripheral ring 33, connecting the ends of the spokes. At the end of each spoke 32 are vertically-extending brackets 34, said brackets being provided on their outer  
 10 face with vertical slots 35.

36 represents flat springs which are seated in the slots 35 and have their upper ends connected to the brackets 34 by means of rivets 37, said springs pressing outwardly  
 15 against the inner sides of the well-casing and holding the pump-shaft at the center of the casing. The brackets 34 extend outwardly beyond the outer line of the screw-blades, so that even were the springs entirely com-  
 20 pressed within the recesses in the brackets still the periphery of the screw-blades would not come in contact with the sides of the casing.

In Fig. V, I have shown a modification of  
 25 my screw-blades in which there is only one convolution or two sections forming one convolution, said blades being provided with vertical flanges 38, which retain or prevent the water from passing down between the outer  
 30 edges of the blades and the well-casing. In Fig. V, I have also shown a modification of the pump-operating shaft 12, the sections being coupled together by universal joints consisting of knuckles 39 40, secured to each  
 35 other by pins 41 42. The knuckles 40 are connected with a short section of threaded pipe 43, which screws into the hub 25 of the screw-blades, the jointed pump-shaft being  
 40 bent in driving, thus dispensing with the

usual practice of placing a smaller straight casing within a larger crooked casing.

I claim as my invention—

1. A rotary pump comprising a casing, a rotary shaft consisting of sections having screw-  
 45 threaded ends, the screw-blade having an internally-screw-threaded hub, within which the adjacent screw-threaded ends of the shaft-sections engage, and a peripheral shell contiguous to the casing, the guide having a hub,  
 50 radial spokes, a peripheral ring and vertical brackets, extending upwardly and downwardly from the ring, and a set collar, whereby the hub of the guide is secured against the hub of the screw-blade; substantially as  
 55 described.

2. As a new article of manufacture, a guide for the shafts of rotary pumps consisting of a central hub through which the shaft passes, radiating spokes, brackets on the ends of said  
 60 spokes, recesses in said brackets, and flat springs having one of their ends secured in said recesses, substantially as set forth.

3. A rotary pump comprising a casing, a rotary shaft consisting of sections having knuc-  
 65 kles and screw-threaded ends, the screw-blade having an internally-screw-threaded hub, within which the adjacent screw-threaded ends of the shaft-sections engage, a peripheral shell contiguous to the casing, and a  
 70 guide having a hub, radial spokes, a peripheral ring and vertical brackets, the hub of the guide being secured against the hub of the screw-blade by one of the knuckles, which acts as a collar; substantially as described.  
 75

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