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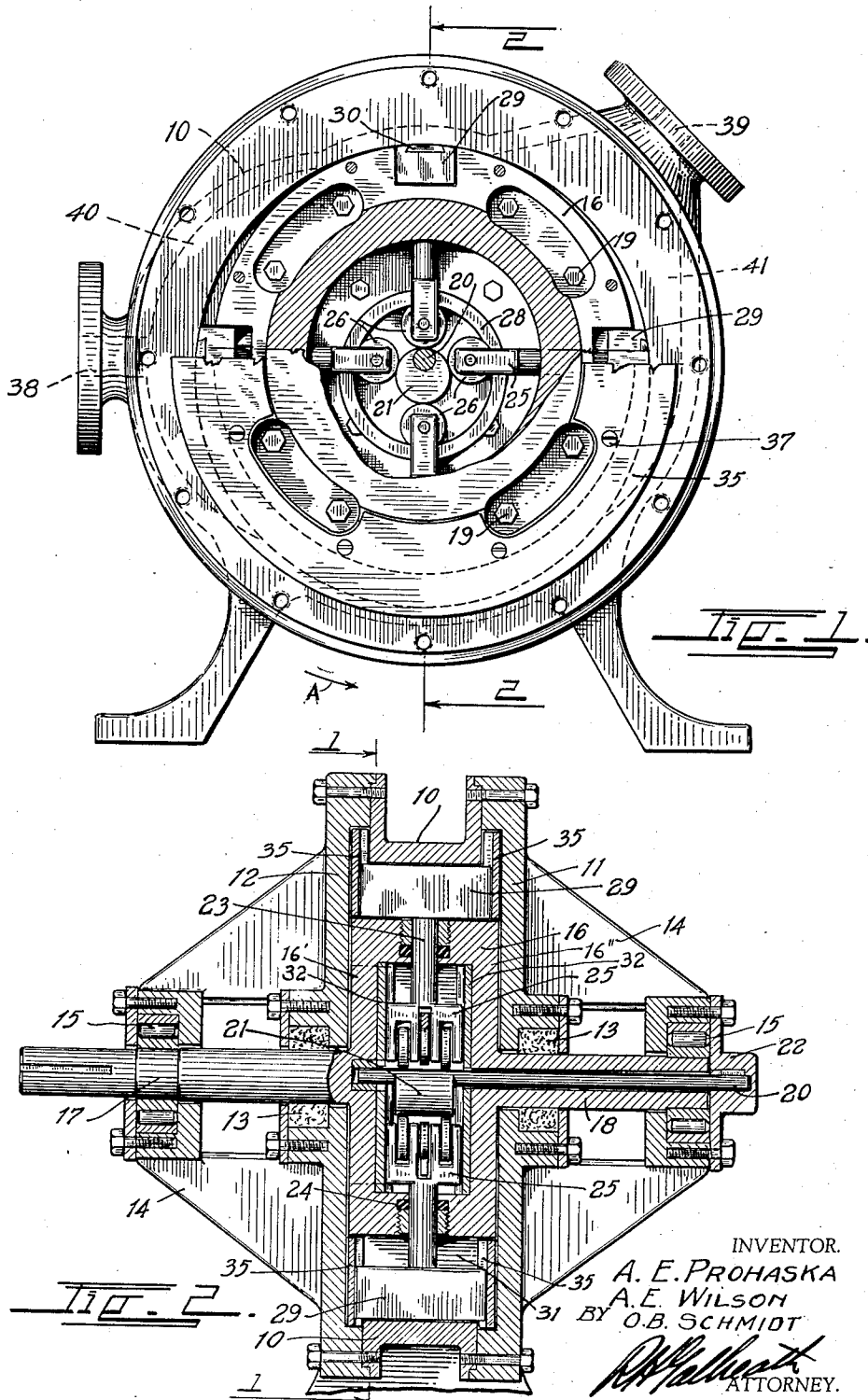
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ROTARY PUMP

Filed Oct. 26, 1936

2 Sheets-Sheet 1



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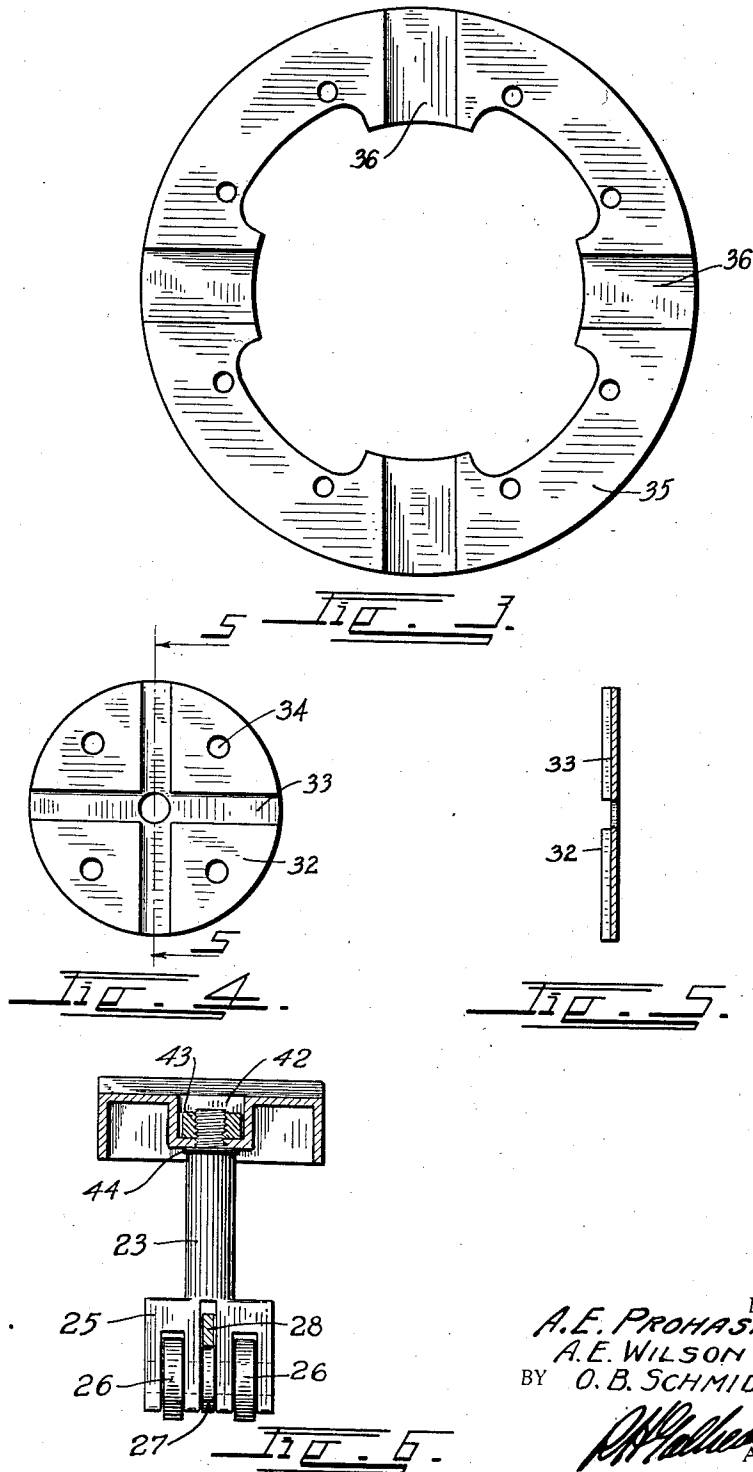
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ROTARY PUMP

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5 Claims. (Cl. 103—136)

This invention relates to a rotary pump and has for its principal object the provision of a highly efficient pump which will produce a maximum continuous stream for a minimum input of power.

Other objects of the invention are to produce a pump which will be economical to manufacture; in which an accurate adjustment of the parts can be obtained; in which sand or grit in the material being pumped will have but a minimum effect upon the pumping mechanism; and in which relatively high pressures can be obtained without binding, clamping or undue friction.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawings which form a part hereof. Like numerals refer to like parts in all views of the drawings and throughout the description.

In the drawings:

Fig. 1 is a vertical cross section through the pump, taken on the line 1—1, Fig. 2.

Fig. 2 is a longitudinal section, taken on the line 2—2, Fig. 1.

Fig. 3 is a detail face view illustrating the construction of the outer vane guide plates.

Fig. 4 is a detail face view of the inner vane guide plates.

Fig. 5 is a section through the inner plates, taken on the line 5—5, Fig. 4.

Fig. 6 is a detail view illustrating an alternate vane construction.

The pump illustrated herein is particularly designed as an improvement on the pump illustrated in applicant's Patent No. 2,003,615.

The pump comprises a cylindrical pump housing 10, the sides of which are closed by means of a rear face plate 11 and a front face plate 12. The housing 10 is provided with an intake 38 and with an outlet 39 preferably flanged to receive flanged pipe connections. The face plates 11 and 12 are provided with packed openings 13 for the passage of the pump shaft. These openings are positioned eccentrically of the axis of the housing 10. Bearing brackets 14 extend outwardly from the face plates to support outboard bearings 15.

The rotor of the pump is designated in its entirety by the numeral 16, is formed integrally with the shaft thereof and consists of two coacting flanged discs 16' and 16'' respectively. The disc 16' is formed as an enlargement of a drive shaft 17, to which any suitable drive gear or pulley

may be attached. The disc 16'' is formed as an enlargement of a tubular shaft 18 which extends outwardly from and in axial alignment with the shaft 17. The two parts of the rotor are clamped together by means of suitable clamp bolts 19 so as to enclose a hollow interior.

A cam shaft 20 extends from a cam 21 in the hollow interior of the rotor to a bearing cap 22 on the rear outboard bearing 15. The cam shaft is keyed or otherwise secured from rotation in the bearing cap 22 so as to hold the cam 21 in a stationary position. The cam 21 is cylindrical and in axial alignment with the housing 10.

A series of vane rods 23 extend radially outward from the rotor through suitable packing glands 24. The inner extremities of the vane rods are formed with roller yokes 25 to support three rollers. The outer two rollers 26 ride upon the surface of the cam 21. The inner roller 27 rides upon the inner surface of a floating guide ring 28 which ties the rollers 27 of all of the vane rods 23 together against the surface of the cam 21.

The outer extremities of the vane rods 23 are secured in laterally extending vanes 29 which terminate in close proximity to the inner wall of the housing 10. Sealing plates 30 are carried in the outer faces of the vanes 29 to seal them with the inner wall of the housing. The vanes are maintained lateral to the face of the rotor by means of guide grooves or channels 31 milled across the rotor.

The yokes 25 are maintained in alignment with the cam 21 by means of a pair of inner guide plates 32, one of which is secured in the bottom of the socket in each of the rotor members 16' and 16''. The construction of these inner guide plates is shown in Figs. 4 and 5. They are provided with radially extending track grooves 33, in which the extremities of the yokes 25 ride, and with suitable bolt holes 34 for attaching them rigidly in place.

The extremities of the vanes 29 are sealed and guided in outer guide plates 35, illustrated in detail in Fig. 3. The outer guide plates are provided with depressed guide tracks 36, in which the extremities of the vanes 29 snugly fit. The outer guide plates 35 are secured to the rotor by means of suitable countersunk screws 37 and travel in counterbores in the face plates 11 and 12 to prevent leakage around them.

The vane rods 23 may be threaded so that they can be minutely adjusted as to length. It is preferred to have the length of the vane rods such that they will hold the vanes slightly out of contact with the inner wall of the housing, say about .001 inch, so as to prevent wear between the vanes

and the inner housing wall. The floating ring 28 about the rollers 27 prevents the vanes from expanding into contact with the inner housing wall.

5 In operation, the device is preferably rotated in the direction of the arrow A, Fig. 1. Water will be forced ahead of each vane around the bottom of the rotor and discharged to the outlet 39. At the top of the rotor, the vanes are flush with the surface thereof so that no water can return to the intake, thus a continuous stream of water is drawn in the intake 38 and forced out the outlet 39.

10 It is preferred to form a relatively long intake pocket 40 opposite the intake 38, and a similar relatively long discharge pocket 41 opposite the discharge 39.

In Fig. 6, an alternate construction of the vane is illustrated. In this figure, the vane is hollow to lighten its weight, and is provided with a countersunk nut socket 42 to receive a nut 43. The length of the assembly is controlled by means of shim washers 44 positioned between the vane and a shoulder on the vane rod 23. The socket 43 is covered when in use by the sealing plate 30.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. In a rotary pump, a casing, a cylindrical rotor eccentrically mounted in said casing; vane shafts extending radially outward from said rotor through the cylindrical wall thereof; a vane carried by each of said shafts parallel to the axis of said rotor; a stationary cam within said rotor, concentric with said housing; a plurality of rollers on the inner extremity of each vane shaft, certain of the rollers on each shaft riding against said cam while another is spaced from said cam; and a floating ring surrounding said cam and said latter rollers, said latter rollers contacting the inner face of said floating ring to hold the latter concentric with said cam.

2. A rotary pump comprising: a cylindrical closed housing; a rotor eccentrically positioned in said housing; circular end walls closing the ends of said rotor; a cylindrical side wall enclosing the sides of said rotor to form a completely enclosed cylindrical space therein; an axle shaft extending outwardly from each circular end wall; eccentrically positioned bearings in said housing for said shaft; cylindrical vane shafts extending radially through bearing openings in the cylindrical side wall of said rotor on the medial line thereof; a vane secured on the outer end of each of said vane shafts and extending laterally of said side wall; a cam within the enclosed cylindrical space of said rotor, said cam being concentric with said housing; a head on the inner extremity of each vane shaft; a pair of rollers mounted in each head and contacting said cam; a third roller in each head intermediate the said pair of rollers, said third roller being out of contact with said cam; and an unattached ring enclosing and contacting all of said third rollers to maintain said pairs of rollers in contact with said cam.

3. A rotary pump comprising: a cylindrical closed housing; a rotor eccentrically positioned in

said housing; circular end walls closing the ends of said rotor; a cylindrical side wall enclosing the sides of said rotor to form a completely enclosed cylindrical space therein; an axle shaft extending outwardly from each circular end wall; eccentrically positioned bearings in said housing for said shaft; cylindrical vane shafts extending radially through bearing openings in the cylindrical side wall of said rotor on the medial line thereof; a vane secured on the outer end of each of said vane shafts and extending laterally of said side wall; a cam within the enclosed cylindrical space of said rotor, said cam being concentric with said housing; a T-head on the inner extremity of each vane shaft lying in the same plane with the vane of that shaft; rollers journaled in said T-heads and riding on said cam; means for preventing rotation of said cam and circular guide plates at each end of said cylindrical enclosed space, said plates having radial grooves in the inner faces into which the extremities of said T-heads project to prevent rotation of said vane shafts.

4. A rotary pump comprising: a cylindrical closed housing; a rotor eccentrically positioned in said housing; circular end walls closing the ends of said rotor; a cylindrical side wall enclosing the sides of said rotor to form a completely enclosed cylindrical space therein; an axle shaft extending outwardly from each circular end wall; eccentrically positioned bearings in said housing for said shaft; cylindrical vane shafts extending radially through bearing openings in the cylindrical side wall of said rotor on the medial line thereof; a vane secured on the outer end of each of said vane shafts and extending laterally of said side wall; a cam within the enclosed cylindrical space of said rotor, said cam being concentric with said housing; a head on the inner ends of each of said vane shafts; rollers in each head contacting said cam; means for preventing rotation of said cam; means for preventing rotation of said vane shafts in said cylindrical rotor wall and a floating ring member surrounding said cam and passing through all of said heads to maintain the latter about said cam.

5. A rotary pump comprising: a cylindrical closed housing; a rotor eccentrically positioned in said housing; circular end walls closing the ends of said rotor; a cylindrical side wall enclosing the sides of said rotor to form a completely enclosed cylindrical space therein; an axle shaft extending outwardly from each circular end wall; eccentrically positioned bearings in said housing for said shaft; cylindrical vane shafts extending radially through bearing openings in the cylindrical side wall of said rotor on the medial line thereof; a vane secured on the outer end of each of said vane shafts and extending laterally of said side wall; a cam within the enclosed cylindrical space of said rotor, said cam being concentric with said housing; a T-head on the inner extremity of each vane shaft lying in the same plane with the vane of that shaft; rollers journaled in said T-heads and riding on said cam; means for preventing rotation of said cam; and an annular ring member passing through all of said T-heads to hold said rollers in contact with said cam.

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