The present invention provides a rotary pump having a rotor between two rotary parallel plates, said rotor having at regular intervals plural flexible blades and fixing at an eccentric shaft, said plate having along its circumference are guide holes as many as said blades, said guide hole inserted by a rod to pass through a hole of an end of said blade and to insert into another opposite guide hole.

1 Claim, 5 Drawing Figures
FLEXIBLE BLADE ROTARY PUMP

BACKGROUND OF THE INVENTION

1. Field of the Invention

The rotary pump of the present invention belongs to U.S. Cl. 415/125, 415/140, 415/141; namely rotary kinetic fluid motors or pumps, including means to cause cyclical movement of a part (e.g., blade etc.), resilient or movably mounted blade portion, and yielding or pivotally mounted or flexible blade.

2. Description of the Prior Art

The former rotary pumps are briefly classified into (a) three-lobe pump (b) two-screw pump (c) external gear pump (d) sliding vane pump, but a special type of the present invention has a rotor protectively sandwiched between two parallel rotary discs, said rotor having plural flexible blades and fixing at an eccentric shaft, said blade dragging its end along an inside circular wall, said plate almost simultaneously rotating with said rotor by means of rods playably connecting said disc with said ends, so that it transfers so highly viscous fluid as heavy oil etc., with more durability against abrasion and corrosion, under lighter weight and less noises.

SUMMARY OF THE INVENTION

The present invention provides a rotary pump comprising an eccentric rotor sandwiched between two parallel rotary discs; the rotor having plural flexible blades; the disc having along its circumference guide holes; the blade projecting slantly backward against a direction of rotation; the guide hole inserted by a rod to pass through the end of the blade to insert into the opposite guide hole; and the rotor and the disc rotating almost simultaneously to transfer so highly viscous fluid as heavy oil etc., with more durability against abrasion and corrosion, under lighter weight and less noises.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a cross section perpendicular to an axis of one preferred embodiment of the present invention taken along line 1—1 of FIG. 2 in the direction of the arrows. FIG. 2 is an axial cross section of FIG. 1 taken along line 2—2 of FIG. 1 in the direction of the arrows. FIG. 3 is a front view of a rotor. FIG. 4 is a front view of a disc. FIG. 5 is an axial cross section of another preferred embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The rotary pump of the present invention will be described in more detail in connection with the preferred embodiments.

FIG. 1 shows a rotary pump having a circular chamber 1 comprising a casing 1a which is put on by a cover plate 1b with bolts 2,2 tightened. An inlet 3 and an outlet 4 are projected from the left and right sides of the chamber 1. A driving shaft 5 is horizontally and eccentrically low bridged over in the chamber 1. A rotor 6 is mounted on the shaft 5. Plural number of flexible or elastic blades 6a, 6b, 6c, 6d of rubber or plastic are at regular intervals projected from the rotor 6 en bloc slantly to an opposite direction against rotation. Semi-circular ends 6ai, 6bi, 6ci, 6di of the blades 6a, 6b, 6c, 6d have respectively small holes 7a, 7b, 7c, 7d to be inserted by rods 8a, 8b, 8c, 8d.

Two discs 9,9 are positioned between the chamber 1 and the rotor 6 as they sandwich the rotor 6. A hole 10 is circularly formed at the center of the disc 9 more largely than the section of the shaft 5. Guide holes 11a, 11b, 11c, 11d are formed like arc along the circumference of the disc 9 as many as the blades 6a, 6b, 6c, 6d.

The shaft 5 passes through the holes 10,10 of the discs 9,9. Each rod 8 is passed through the hole 7 of each blade 6 and the both ends of said rod 8 get in the opposed guide holes 11,11 of the discs 9,9.

Small recesses 12a, 12b, 12c, 12d are formed respectively at the inside roots of the blades 6a, 6b, 6c, 6d, which are equal to vertexes of slanting angles of said blades, in order to prevent padding which is caused by laying down of said blades.

Bearing metals 13,13 are innerly mounted in the casing 1a and the cover plate 1b to support the shaft 5. An O-ring 14 is set about the shaft 5 for seal.

Accordingly when driving the shaft 5 in connection with the prime mover (not shown), the rotor 6 will rotate as the blades drag their ends along the inside wall of the chamber 1.

Especially the blade will be strongly pressed at the bottom of the chamber 1 and elastic energy will be accumulated enough to press forward even so highly viscous fluid as heavy oil etc.

FIG. 5 shows another rotary pump having a chamber 101 comprising a casing 101a which is put on by a cover plate 101b with bolts 102,102.

A driving shaft 105 is horizontally and eccentrically low bridged over in the chamber 101.

A rotor 106 is mounted on the shaft 105.

Ends of flexible or elastic blades of the rotor 106 have respectively small holes 107 to be inserted by rods 108.

Two discs 109,109 are positioned between the chamber 101 and the rotor 106 as they sandwich the rotor 106.

A hole 110 is circularly formed at the center of the disc 109 more largely than the section of the shaft 105.

Guide holes 111 are formed like arc along the circumference of the disc 109 as many as the blades 106.

The shaft 105 passes through the holes 110,110 of the discs 109,109.

Bearing metals 113,113 are innerly mounted in the casing 101a and the cover plate 101b to support the shaft 105.

An O-ring 114 is set about the shaft 115 for seal.

A protuberance part 101a is formed at the inside wall of the casing 101a to fit into the gap between the hole 110 and the bearing metal 113.

Another protuberance part 101b is formed at the inside wall of the cover plate 101b to fit into the gap between the hole 110 and the bearing metal 113.

In the present invention the blades are protected from defacement by the two adjacent discs which will rotate almost simultaneously with the blades.
The pump of the present invention may transfer so highly viscous fluid as heavy oil etc., with more durability against abrasion and corrosion, under lighter weight and less noises.

What I claim is:

1. In a rotary pump, housing means defining in its interior a circular chamber, rotary shaft means carried by said housing means for rotation about the axis of said rotary shaft means, said rotary shaft means being eccentrically mounted with respect to said circular chamber the latter having an axis spaced from and extending parallel to the axis of said rotary shaft means, and a pair of parallel rotary discs situated in said circular chamber and formed with openings passing therethrough and having a diameter large enough to accommodate said rotary shaft means, said pair of discs extending perpendicularly to said rotary shaft means, and rotor means situated between said pair of discs and operatively connected with said shaft means to rotate therewith, said rotor means having a central hub portion fixed to said rotary shaft means and a plurality of blade portions extending outwardly from said central hub portion, said blade portions being flexible and each having a leading convex surface and a trailing concave surface, said concave surface of each blade portion being formed at its connection to said hub portion of said rotor means with an axially extending groove which thus is situated at the base of the convex leading surface of the next following blade portion, said blade portions respectively carrying at their outer ends longitudinally extending rods which are parallel to the axis of said shaft means and said discs respectively being formed with arcuate slots passing therethrough and receiving ends of said rods with said slots extending along a circle concentric with the axis of said chamber, whereby during rotation of said rotor means, said blade portions are free to move with respect to said discs at said rods which are movable along said slots while flexing is facilitated by said axially extending grooves.

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