May 7, 1929. S. MORITA 1,712,157

WEARLESS GEARED PUMP

Filed Jan. 16, 1926

Fig. 1.

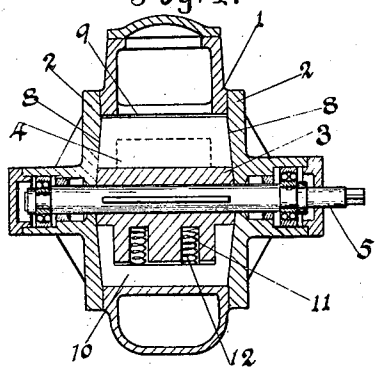


Fig. 2.

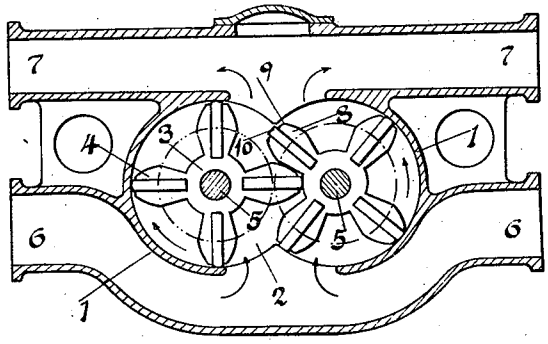
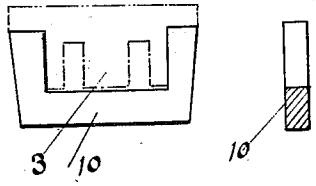


Fig. 3.



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UNITED STATES PATENT OFFICE.

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WEARLESS GEARED PUMP.

Application filed January 16, 1926. Serial No. 81,690.

This invention relates to an improvement in a rotary pump of geared type and has for its object an improved geared pump in which a slider arranged in each of the teeth of the rotor is always tightly pressed to the surfaces of the drum and the end cover of the pump by a combined action of centrifugal force and spring so that any constructional errors or inaccuracy of the sliding parts of the pump or any wear of the same which may occur in the run of the working of the pump, is entirely and automatically diminished and a perfect fitting of the sliding parts is obtained to give the result of the greatest efficiency of the pump.

The invention may be more fully described referring to the accompanying drawings in which:

Fig. 1 is a section along a plane parallel to the axle of the rotating shaft,

Fig. 2 is a section along a plane at right angle to the axle of the rotating shaft, and

Fig. 3 is an elevation of a slider employed in this invention.

In the drawings 1 is the casing of a pump; 2 and 2 are the end covers or casing walls of both sides of the casing; 3 and 3 the rotors; 4 the teeth of the rotors; 5 the rotating shaft; 6 the suction and 7 the delivery. The end faces of the rotors which contact with the casing walls are so shaped as to generate, when said rotors are rotated, convexed cones whose axes coincide with the center line of the rotor axes and whose generating lines have apices at spaced points on the rotor axes and are inclined towards each other at a slight angle from a radial line. The inner faces of the casing walls are also constructed as cones having axes which coincide with that of the rotating shaft, the cones nearly conforming to those of the end faces of the rotor 3 so that these two sets of cones are perfectly fitted. At the tip 9 and sides of each of the teeth 4 there is provided a deep guide groove into which the slider or blade 10 conforming to the shape of the groove is slidably fitted, the end faces 8 of the blades 10 which contact with the casing walls being so sloped as to coincide with the inclination of cone of the end faces of rotors and also with that of inner faces. At the bottom of the guide groove, there are provided one or more holes 11, in each of which a spiral spring 12 is arranged. Therefore, when the pump works, the blade or slider 10 is not only projected out by the centrifugal force caused by the rotation of the rotor 3, but also it is pushed outward by these spiral springs. Therefore the tip and sides of the slider are respectively tightly fitted to the drum 1 and the casing wall 2 of the pump. It will be understood that by such construction of the blades as above described, they make better contact by reason of their wedge like shape although there may be some wear in the run of working of the pump, or some manufactural errors in the form of the parts, any gap, between the pump drum, the end covers and the surface of the rotor created by such wear or errors, is entirely and automatically diminished so that air, water or any other fluids, is perfectly prevented from leaking out of the gap and accordingly the efficiency of the pump is remarkably increased. The invention may also be applied to any type of the rotary pumps other than the geared type as exemplified.

Claims:

1. An improved geared pump comprising a casing, casing walls, a pair of rotors, teeth on each of said rotors, blades outwardly slidably mounted on each of the teeth, the end faces of the blades which contact with the casing walls being so sloped as to generate when said rotors are rotated convex cones whose axes coincide with the center line of the rotor axis and whose generating lines have apices at a spaced point on the rotor axis and are inclined toward each other at a slight angle from a radial line, for the purpose specified.

2. An improved geared pump comprising a casing, casing walls, a pair of rotors, teeth on each of said rotors, deep guide grooves of inverted channel shape in the tips and sides of said teeth parallel with the axes of said rotors, and blades slidably mounted in said grooves, the end faces of said blades which contact with the casing walls being so sloped when the said rotors are rotated as to generate convexed cones whose axis coincide with the center line of the rotor axis, and whose generating lines have apices at spaced points on the rotor axis and are inclined toward each other at a slight angle from a radial line, for the purpose specified.

3. An improved geared pump comprising a casing, casing walls, a pair of rotors, the end faces of the rotors which contact with the casing walls being formed as cones whose axes coincide with the center line of the ro-

tor axis, and whose generating lines have apices at spaced points on the rotor axis and are inclined toward each other at a slight angle from a radial line, teeth on each of said rotors, deep guide grooves of inverted channel shape in the tips and sides of the said teeth and blades slidably mounted in the grooves, the end faces of each blade being so sloped as to coincide with the inclination of the cones of the inner faces of the casing walls, for the purpose specified.

4. An improved geared pump comprising a casing, a pair of rotating shafts, casing walls, the inner surfaces of the casing walls which contact with the end faces of rotor and blades being formed as concaved cones whose axes coincide with the center line of the rotating shaft and whose generating lines have apices at spaced points on the axis of rotating shaft, a pair of rotors mounted on the rotating shaft, the end faces of the rotors which contact with the inner faces of the casing walls being formed as concaved cones to tightly contact with the inner faces of the casing walls, teeth on each of said rotors, deep guide grooves of inverted channel shape in the tips and sides of the said teeth parallel with the axes of said rotors and blades of wedge shape slidably mounted in the grooves, the end faces of each blade being so sloped as to coincide with the inclination of the cones of the inner faces of the casing walls, for the purpose specified.

5. An improved geared pump comprising a casing, a pair of rotating shafts, casing walls, the inner surfaces of the casing walls which contact with the end faces of rotor and blades being formed as concaved cones, whose axes coincide with the center line of the rotating shaft and whose generating lines have apices at spaced points on the axis of the rotating shaft, a pair of rotors mounted on the rotating shafts, the end faces of the rotors which contact with the inner faces of the casing walls being formed as concaved cones to tightly contact with the inner faces of the casing walls, teeth on each of said rotors, deep guide grooves of inverted channel shape in the tips and sides of the said teeth, blades slidably mounted in the grooves, the end face of each blade being so sloped as to coincide with the inclination of the cones of the inner faces of the casing walls, openings in the bottom of said grooves and springs in said openings for pressing said blades outwardly, for the purpose specified.

In testimony whereof I affix my signature.

SHOSAKU MORITA.