Nov. 26, 1957 L. LORENZETTI 2,814,255

HYDRAULIC PUMP

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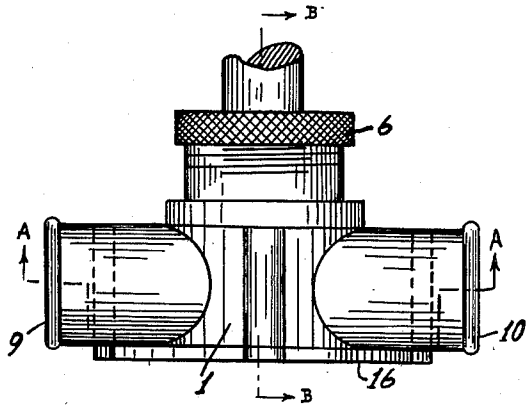


Fig. 1

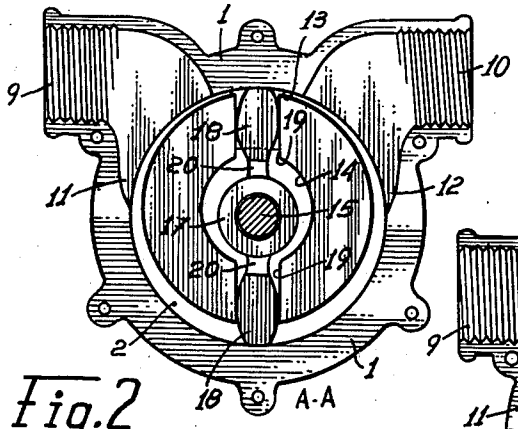


Fig. 2

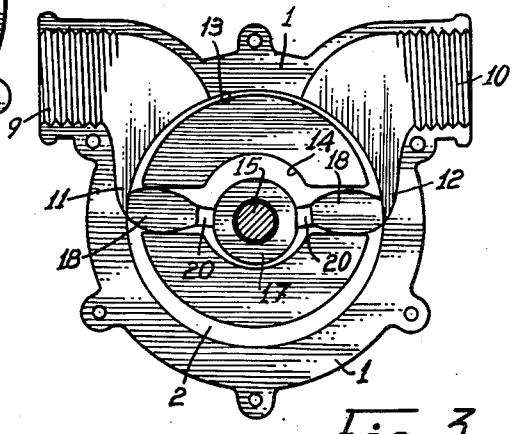


Fig. 3

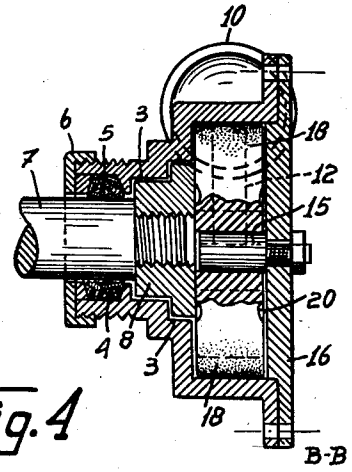


Fig. 4

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HYDRAULIC PUMP

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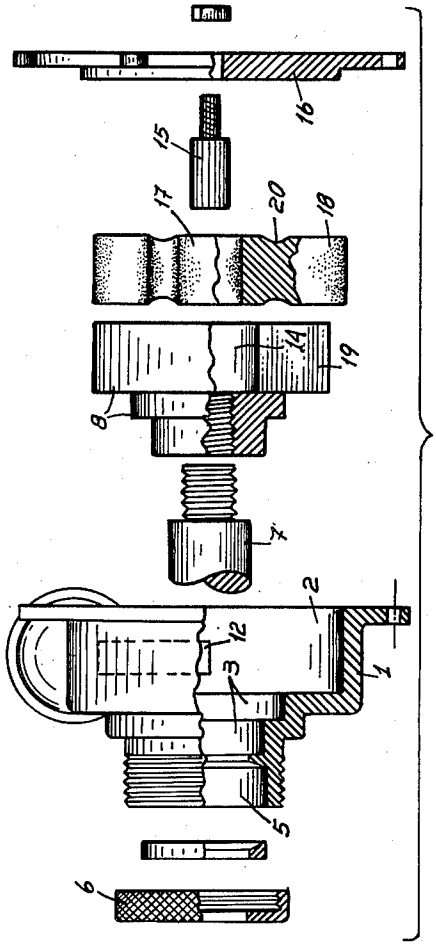


Fig. 5

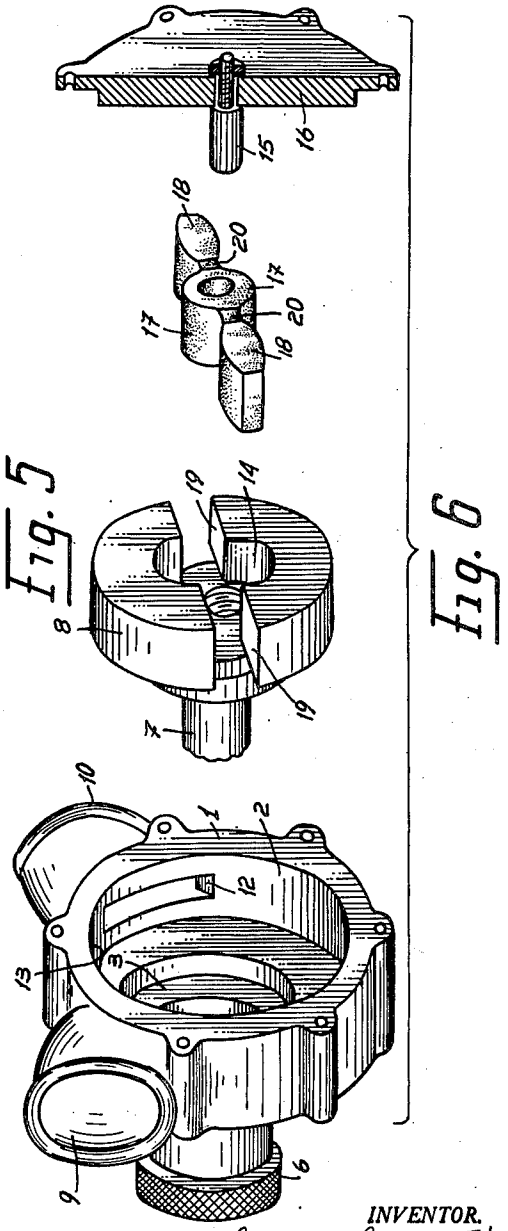


Fig. 6

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HYDRAULIC PUMP

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3 Claims. (Cl. 103—144)

The present invention relates to improvements in hydraulic pumps.

It is one object of the present invention to provide hydraulic pumps which constitute a unit of low cost, of high efficiency and of great simplicity.

It is another object of the present invention to provide hydraulic pumps which bring about a reduction of vibrations and wear which always constituted the greatest obstacle to the use of the rotor type pumps, mainly in hydraulics.

With these and other objects in view which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawings, in which:

Figure 1 is a top view of the improved pump;

Fig. 2 is a section along the lines 2—2 of Fig. 1;

Fig. 3 is a section similar to that shown in Fig. 2, with the rotor pales displaced by 180°;

Fig. 4 is a section along the lines 4—4 of Fig. 1;

Fig. 5 is an exploded elevational view, partially in section, of the pump similar to that shown in Fig. 4; and

Fig. 6 is an exploded perspective view, partially in section, of the pump.

Referring now to the drawing, the improved pump comprises a main member 1 provided with an inner cylindrical chamber 2, which communicates with an eccentric bore 3 disposed in the bottom of the chamber 2 and having several shoulders and leading into a chamber 4, which receives a packing ring 5, tightened by means of a screwed-on cover member 6.

A main shaft 7, passing through the packing ring 5, projects through the eccentrical bore 3 into the inner chamber 2 of the pump where it is secured to a rotor 8 having the shape of a cylindrical crown and complementary to the shoulder portions of the bore 3 and revolves in the chamber 2 eccentrically with respect to the inner cylindrical surface of the same, close to one of the sides of the said surface and precisely where the water inlet 9 and outlet 10 are the nearest, in order to prevent the direct passage or communication between the two.

The water inlet and outlet are formed by two chambers which are connected externally, respectively, to the water-inlet tube and water-outlet tube and, internally, to the cylindrical chamber 2 of the pump through two slots 11 and 12 whose upper ends are separated by the space 13, where the eccentrical crown revolves close to the cylindrical wall of the inner chamber 2 of the pump; the lower end of the slots 11 and 12 are at the same distance from the space 13 and are diametrically opposed to the rotor crown.

Within the crown-shaped eccentrical rotor 8 there is a chamber 14 which receives a fixed shaft 15 disposed parallel to the main shaft 7, and secured to the center of the cover 16 which closes the cylindrical chamber of the pump; it is perfectly centered with the inner cylindrical surface of the unit.

A resilient, symmetrical and balanced member turns

upon the fixed shaft 15 within the inner chamber of the rotor 8 having the shape of an eccentrical crown; its central core 17, which has an axial bore complementary to the outer diameter of the shaft 15. Two or more resilient pales 18 are rigidly secured to the core 17 which pales 18 after passing through the cylindrical crown of the rotor 8 projects into the inner cylindrical surface of the chamber 2 through suitable slots 19 provided in the rotor 8 and having smooth wall surfaces.

The resilient pales 18 are of greater thickness at the points of passing through the crown 8 in order to enter the slots 19 with some resilient pressure, and are given an approximately oval shape so as to easily slide over the smooth walls of the slots 19, making use of the lubrification of the water in the straight and oscillating motions and so as to prevent the flow of water through the slots 19.

The connecting parts 20 of the pales 18, which project from the central core 17, are thinner than the pales 18 and more resilient in order to perform a motion similar to that of connecting rods.

The ends of the pales 18 which revolve close to the inner cylindrical wall of the chamber 2 and which project from the crown 8, when driven by the latter, are given an approximately ogival shape in order that they may bend without touching the ends of the slots 19 and relieve the compression strain over the smooth walls of the slots 19 of the crown 8 and smoothly slide on the inner cylindrical surface of the chamber 2, without pressure, since they turn upon the fixed shaft 15 centered with respect to the cylindrical surface.

The resilient pales 18 have, at the ends which pass through the crown 8, the same height as the crown 8, so that, when the pump is closed by the cover 16, the revolving unit formed by the rotor 8 and the elastic member 17, 18 is adjusted within the cylindrical chamber 2 of the pump, close to the parallel faces of the cover 16 and of the bottom of the chamber.

The described pump operates in the following manner: When the main shaft 7 turns, the crown 8 secured to the shaft 7 will also turn in the inner chamber 2 of the pump, thereby, driving also the resilient member 17 with the pales 18 which are forced, by the motion of the member 17, to slide with the thick ends within the slots 19 of the crown 8, like pistons in cylinders; the connecting parts 20 which project from the central core 17 to the pales 18 are bent and deformed, in order to permit the motion.

Fig. 2 shows a resilient member comprising two pales 18 in the position of least deformation, whereas Fig. 3 discloses a position showing greater deformation of the pales 18.

When a pale during the rotation of the rotor 8 passes by the lower part of the water inlet, it pushes with the end projecting from the crown 8 the water in front of it between the crown 8 and the inner cylindrical wall of the pump, whereas the back portion begins to aspirate the water through the inlet slot.

When the pale 18 has just turned for one-half of a revolution upon the shaft 15, passing beyond the lower end of the water outlet, all the water which is disposed between the rotor 8 and the cylindrical wall of the pump is pushed out, into the space between the water inlet and the water outlet and another quantity of liquid is permitted to enter the chamber by the same pale 18.

When a pale 18 has just completed this cycle, the next pale 18 has already started its cycle, thereby, forming a continuity of compression and suction, always avoiding the return of water from the outlet chamber into the inlet chamber.

At each cycle, the pales 18 receive a water impact proportional to the compression and suction, which impact

is partly absorbed through the resilience of the ends of the pales **18** which, thus, dampen the vibrations which are dangerous and hinder the proper working of the pump.

In the oscillating motion of the pales **18**, the inner portion **20** of the resilient member is also deformed and the central bore which surrounds the fixed shaft **15** expands and contracts while revolving, thereby, drawing and expelling the water and performing a perfect lubrification.

The above described improvements bring about a perfect unit of practically unlimited working with obvious advantages.

While I have disclosed one embodiment of the present invention it is to be understood that this embodiment is given by example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claims.

I claim:

1. In a hydraulic pump, the combination with a cylindrical chamber, and a driven rotor rotatable within said chamber on an axis eccentric to the axis of said chamber, said rotor being provided with diametrically opposed slots, of at least two pales mounted concentrically within said chamber and extending through said slots, respectively, with such length that they are compressed so as to provide for running engagement with the interior periphery of said chamber, a fixed shaft disposed concentrically in said chamber, a core member having a central bore and rotatably mounted on said fixed shaft, said pales and said core member being of resilient material and capable

of being compressed and deformed, thereby providing the running contact of said pales with the inner periphery of said chamber and a seal between said pales and said slots, as well as an expansion and contraction of the core for lubrication, at least two resilient connecting parts projecting radially from said core member and connecting the latter with each one of said pales, and the latter being of greater thickness than the width of said slots.

2. The pump, as set forth in claim 1, wherein said pales are of substantially oval shape and compressed when received in said slots and the latter have smooth walls, to provide a good sealing effect in order to prevent flow of liquid through said slots.

3. The pump, as set forth in claim 1, wherein said rotor transmits an oscillating motion to said pales, and said core member being capable of being deformed and, thereby, permits expansion and contraction thereof, so that water is drawn and expelled, and to provide lubrication for said fixed shaft.

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