

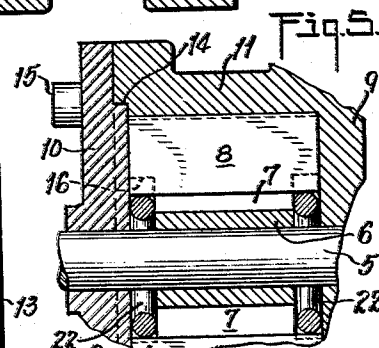
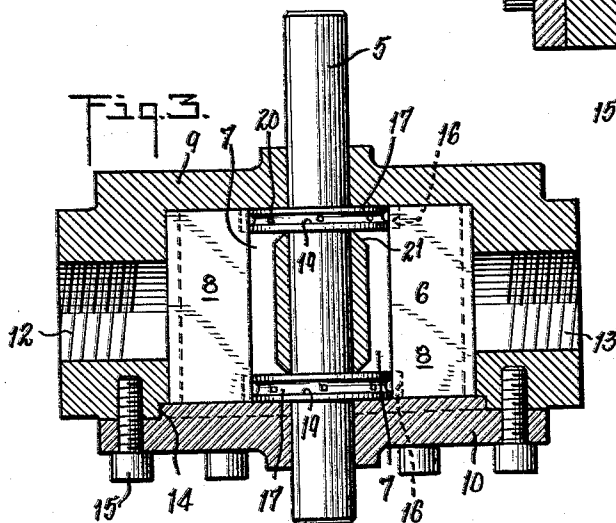
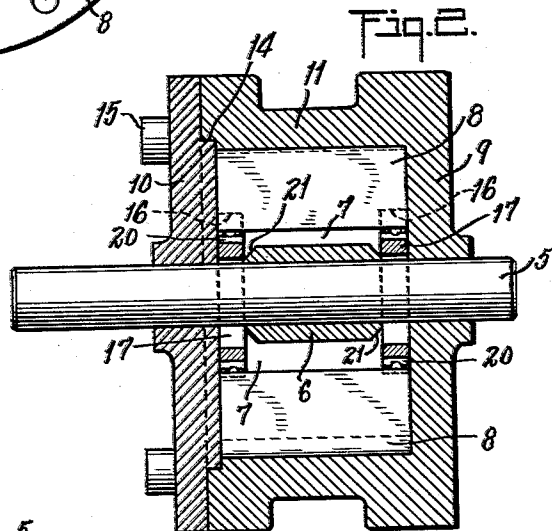
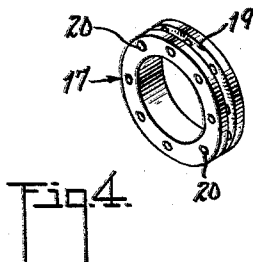
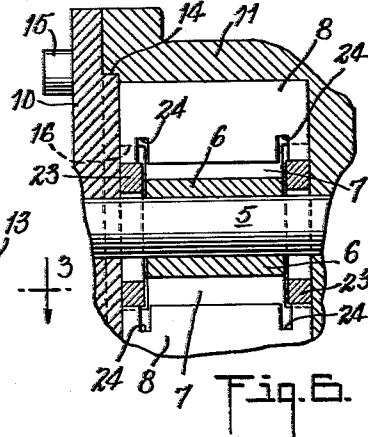
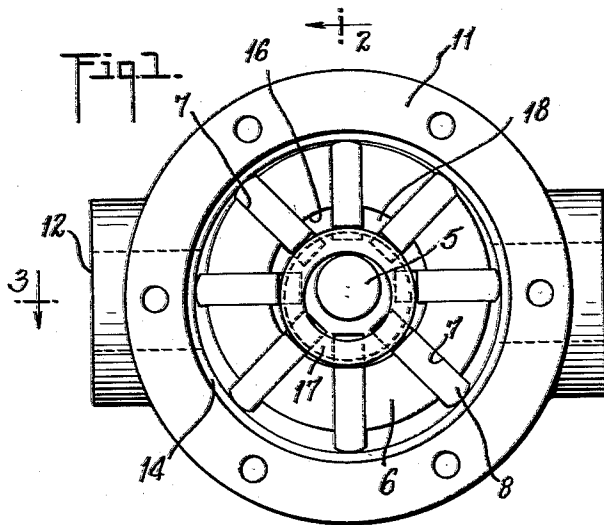
July 23, 1963

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3,098,451

ROTARY MACHINE

Filed Nov. 4, 1960



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3,098,451

ROTARY MACHINE

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Filed Nov. 4, 1960, Ser. No. 67,256

2 Claims. (Cl. 103-136)

The invention here disclosed relates to machines of the rotary pump type having blades slidingly confined in slots in a rotor operating eccentrically in a cylindrical pump chamber.

Objects of this invention are to provide such a machine in a simple inexpensive construction in which the blades will operate freely and smoothly and will automatically adjust themselves and compensate for wear.

Other special objects of the invention are to relieve internal pressures and prevent development of opposing or counterbalancing forces.

The foregoing and other desirable objects are accomplished by certain novel features of construction, combinations and relations of parts, all as hereinafter described and claimed.

The drawing accompanying and forming part of this specification illustrates a present practical embodiment of the invention. Structure however may be modified and changed as regards this particular illustration, all within the true intent and scope of the invention as hereinafter defined and claimed.

FIG. 1 in the drawing is an elevation of a pump structure embodying the invention, with front cover removed.

FIG. 2 is a vertical cross section of the complete structure on substantially the plane of line 2-2 of FIG. 1.

FIG. 3 is a horizontal sectional view on substantially the plane of line 3-3 of FIG. 1.

FIG. 4 is a perspective view of one of the blade controlling rings.

FIG. 5 is a broken sectional detail showing a modified form of the blade controlling rings.

FIG. 6 is a similar view of another modification.

In the illustration the shaft of the pump or rotary machine is shown at 5 carrying a rotor 6 having radial slots 7 receiving the blades 8 operating concentrically in the cylindrical chamber in which the shaft is eccentrically journaled.

This chamber is shown as made up of parallel end walls 9 and 10 connected by a cylindrical annular wall 11.

The inlet and outlet ports, which may be considered as reversible, according to the direction of turning of the rotor are indicated at 12 and 13 opening through the cylindrical wall of the pump chamber at opposite sides of the rotor.

The end wall 10 is shown as a removable cover inset or shouldered into the end of the circumferential wall at 14, secured so by bolts or screws 15.

A special feature of the end walls is that they are each in a single smooth flat plane, free of shoulders or other projections as shown in FIGS. 2 and 3.

Similarly the ends of the rotor and the ends of the blades are on simple flat planes, the blades flush with the ends of the rotor and both blades and rotor in flat running engagement or cooperation with the flat internal surfaces of the end walls.

The ends of the rotor are formed with annular recesses 16 and free floating rings 17 of lesser diameter are loosely seated in these recesses, these rings having an internal diameter enough greater to clear the shaft, FIG. 2, and an external diameter sufficient by engagement with the inner edges of the blades to hold these blades outward in free sliding engagement with or with desirable clearance in respect to the surrounding circumferential wall of the housing.

These blade controlling rings have free sliding and

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rotative movement at the ends of the rotor and so may follow the blades and rotor or remain at rest with respect to either or both these elements. They are thus in effect self-adjusting responding to different conditions and serving in all cases to hold the blades radially outward in proper operating relation to the walls of the cylindrical casing.

As shown in FIG. 1 the loose or free rings 17 tend to maintain a concentric relationship with the casing at all times, with pressure on diametrically opposite sides of the rings equalized by the blades at opposite sides enabling the blades to automatically adjust themselves to compensate for any variations in size of wear of the blades.

To relieve or prevent any opposing development or buildup of pressure by the blades operating in the crescent shaped spaces 18, FIG. 1, between the outer peripheries of the rings and the surrounding walls of the annular cavities 16, these rings may be grooved in their peripheries as indicated at 19, FIG. 4. These grooves will form passes communicating the enlarging and decreasing spaces created by the rotating blades, thus avoiding any development of opposing pressures.

To overcome any tendency of reciprocating motion of the blades in the slots creating opposing forces the rings may have openings 20 therethrough in communication with the annular grooves 19 which will prevent undesirable pumping action of the blades in their slots.

As an alternative, or in addition, the rotor slots may be opened or relieved at the ends as indicated at 21, FIG. 2, to pass fluid freely into and out of the spaces behind or in back of the blades.

The invention provides a particularly simple inexpensive compact small size and lightweight form of construction which may be operated at high speed with low power effort because of the elimination of internal opposing forces within the machine. The rings can be made quite small and light in weight since these are not subjected to load during ordinary running of the machine, centrifugal force tending to keep the blades outward in cooperative relation with the wall of the casing. In the rest position these rings hold the blades outward in their slots in position to cooperate with the surrounding wall on starting of the machine. The cross sectional shape of the rings may vary. These may be of circular cross section, thus to provide passes at the ends of the slots in the rotor for relieving or preventing buildup of internal pressure. This circular cross section form of blade controlling rings is illustrated at 22 in FIG. 5.

FIG. 6 illustrates a further variation in which the rings 23 are of substantially rectangular cross section and in which relief for preventing or avoiding buildup of opposing pressures within the machine is provided by radial slots 24 in the inner edges of the blades communicating the ends of the rotor slots 7 with the ends of the rings.

What is claimed is:

1. A rotary machine comprising a casing having a cylindrical body portion and end walls cooperatively forming a cylindrical pump chamber, a shaft journaled eccentrically in said cylindrical pump chamber, a rotor carried by said shaft in eccentric relation to said cylindrical pump chamber, the cylindrical body portion of the casing having inlet and outlet ports at opposite sides of said rotor, said rotor having radial slots therein, blades slidingly confined in said slots and having the ends of the same flush with the opposite ends of the rotor, said rotor having concentric annular recesses in the ends of the same about the shaft intercepted by said slots and whereby the inner edges of the blades at opposite ends are exposed in said annular recesses and blade controlling rings loosely seated in said annular recesses in the ends of the rotor, said rings having an internal diameter greater than and clear of said shaft and an external diameter sufficient in

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engagement with the blades to hold them radially outward in cooperative relation with the cylindrical wall of the casing, the end walls of said casing each being smooth and flat in a single plane, with said rings, the rotor and the ends of said blades in flush, free sliding engagement therewith, and said free rings having annular pressure relieving grooves in the peripheral portions of the same and forming circular passages communicating different portions of said annular recesses in the ends of the rotor with the ends of the radial slots in which the blades are slidably confined and said rings having passages there-through from side to side in communication with the slots in the rotor.

2. A rotary machine comprising a casing having a cylindrical body portion and end walls cooperatively forming a cylindrical pump chamber, a shaft journaled eccentrically in said cylindrical pump chamber, a rotor carried by said shaft in eccentric relation to said cylindrical pump chamber, the cylindrical body portion of the casing having inlet and outlet ports at opposite sides of said rotor, said rotor having radial slots therein, blades slidably confined in said slots and having the ends of the same flush with the opposite ends of the rotor, said rotor having concentric annular recesses in the ends of the same about the shaft intercepted by said slots and whereby the inner edges of the blades at opposite ends are exposed in said annular recesses and blade controlling rings loosely seated in said annular recesses in the ends of the rotor, said

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rings having an internal diameter greater than and clear of said shaft and an external diameter sufficient in engagement with the blades to hold them radially outward in cooperative relation with the cylindrical wall of the casing, the end walls of said casing each being smooth and flat in a single plane, with said rings, the rotor and the ends of said blades in flush, free sliding engagement therewith, and pressure relieving passages at the ends of said slots in the rotor communicating the opposite ends of said slots with said concentric annular recesses in the opposite ends of the rotor and extending peripherally about said rings and about the end portions of the blades resting on said rings for preventing build up of pressure in said slots and annular recesses from pumping action of the blades and rings operating in said slots and annular recesses, said pressure relieving passages being communicating passages formed in said rings and rotor.

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