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(54) **REBUILDABLE CASSETTE ASSEMBLY FOR DISPLACEMENT PUMP**

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(57) **ABSTRACT**

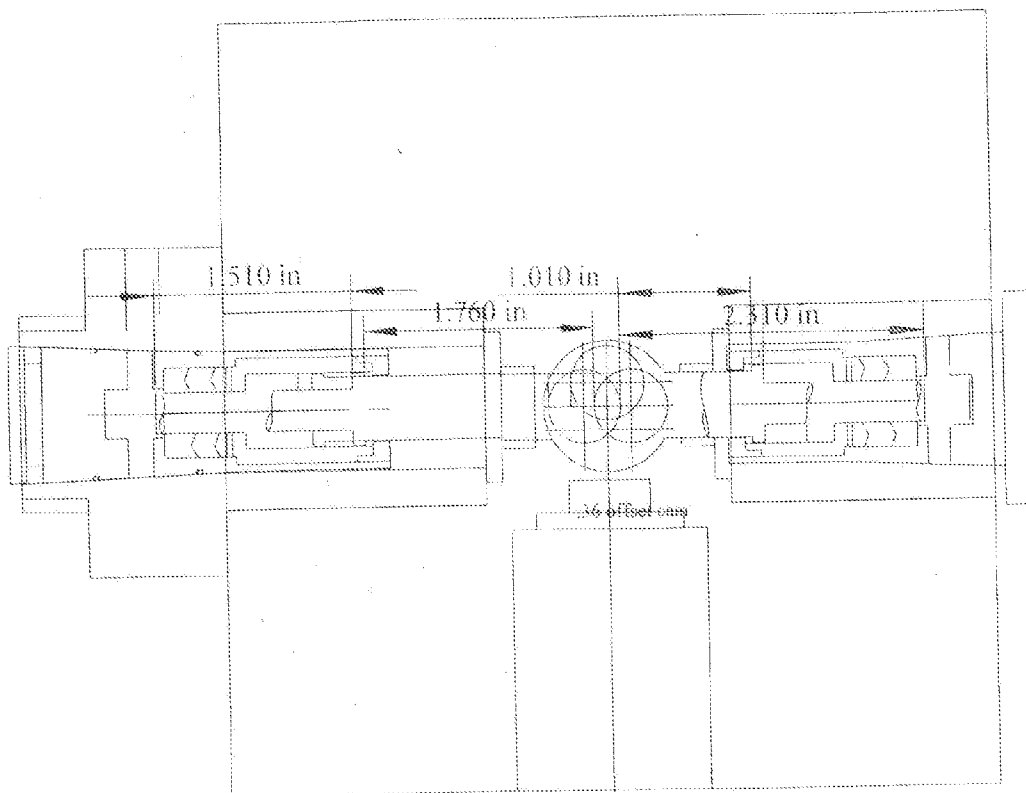
A radial pump has a housing with a cylinder ring pivotally mounted therein. The cylinder ring has a circular aperture within which a cam surface is formed. A cylinder block rotates within the cylinder ring aperture and has a plurality of radially extending cylinders each having port which selectively communicates with a fluid inlet and a fluid outlet as the cylinder block rotates. A plurality of pistons is slideably received within the cylinders and engages the cam surface. The movement of the pistons within the cylinders is directly related to the magnitude of fluid flow delivered by the pump and moving the cylinder ring thereby controls the fluid flow.

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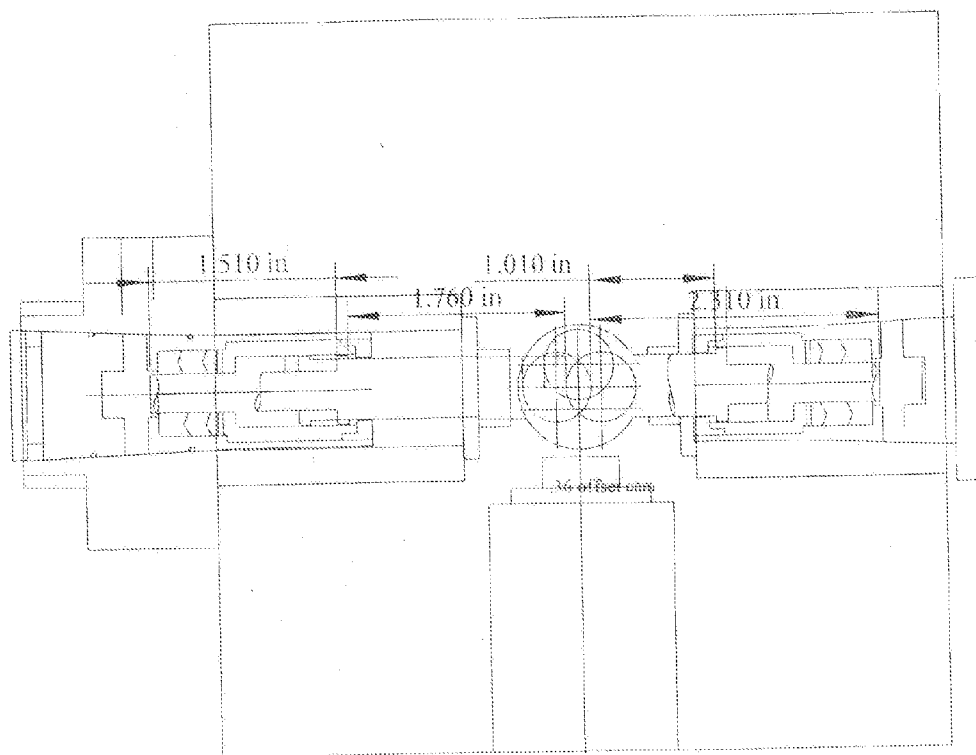


FIG. 1

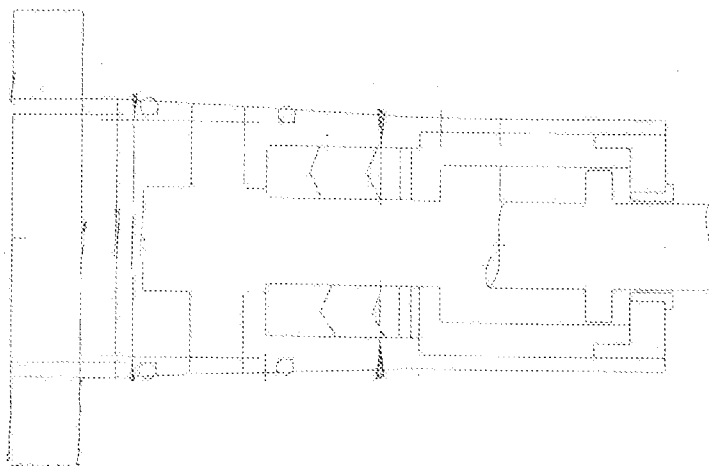


FIG. 2

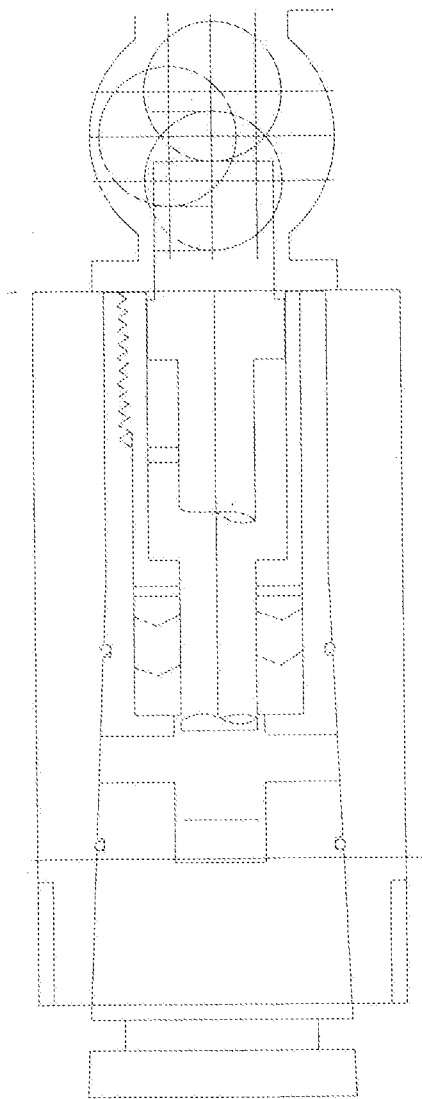


FIG. 3

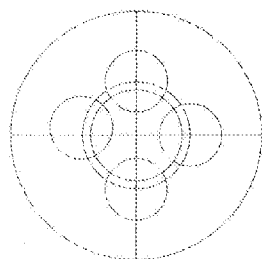


FIG. 4

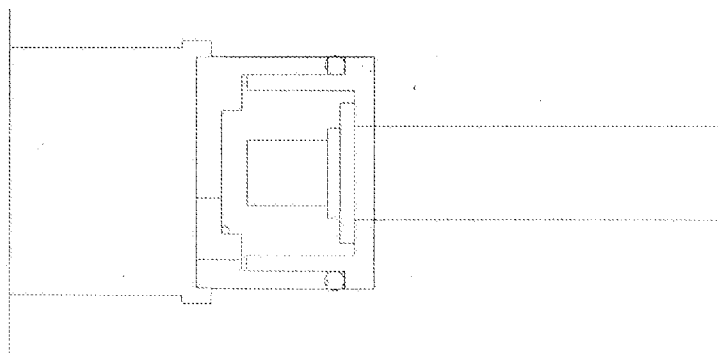


FIG. 5

## REBUILDABLE CASSETTE ASSEMBLY FOR DISPLACEMENT PUMP

### BACKGROUND OF THE INVENTION

**[0001]** 1. Field of the Invention

**[0002]** This invention relates generally to displacement pumps, and more specifically, a replaceable functional hardware assembly for use in a pump.

**[0003]** 2. Description of the Related Art

**[0004]** The prior art inventions include several versions of displacement pumps, which have complex inner workings. There is a need, however, for a pump mechanism that can undergo immediate repairs or replacement in industries such as farming, military use, and process industries, for example industrial cleaning and maintenance use. In this way, the invention overcomes issues in the prior art with rebuilding pumps, specifically, that rebuilding a pump requires it to be removed from the work site and into a workshop, typically requiring several hours or days.

**[0005]** The present invention solves the problems in the industry by providing a replaceable cassette pump assembly. By imparting the functional elements of a pump in a replaceable cartridge, the present invention permits a pump to be repaired on-site.

### BRIEF SUMMARY OF THE INVENTION

**[0006]** The invention is a pump assembly component formed as a cassette that is inserted into a bore in a cam block. The invention allows a pump to be repaired within seconds at the point of operation. The cassette unit has a tapered end region for communication with a pump cam wall to translate pressure to the cam and hold the cassette into the cam.

### BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

**[0007]** FIG. 1 is a cross sectional view of opposing tapered cassettes inserted into a cam block, with the preferred dimensions of the assembly.

**[0008]** FIG. 2 is a cross sectional side view of a single tapered cassette.

**[0009]** FIG. 3 is a cross-sectional view of the tapered portions of the head of the cassette taken along a line perpendicular to a drive shaft in relation to the eccentric cam wheel.

**[0010]** FIG. 4 is a sectional view of the check valve along a longitudinal axis.

**[0011]** FIG. 5 is a cross sectional latitudinal view of the check valve with pump drive shaft extending into the assembly cavity.

**[0012]** In describing the preferred embodiment of the invention which is illustrated in the drawings, specific terminology will be resorted to for the sake of clarity. However, it is not intended that the invention be limited to the specific term so selected and it is to be understood that each specific term includes all technical equivalents which operate in a similar manner to accomplish a similar purpose.

### DETAILED DESCRIPTION OF THE INVENTION

**[0013]** With reference initially to FIGS. 1-5, a cassette has a housing and a cam ring. The cam ring on the outer circumferential side of the rotor is disposed eccentrically with respect to a rotational center of the rotor.

**[0014]** When the pump is operating, a portion of the fluid introduced into the inlet port flows from opening into the

secondary inlet passage and continues to flow to the inlet passage opening. An outlet passage extends through the housing, to an outlet port.

**[0015]** Note that a portion of the outlet passage extends through the housing behind the internal cavity.

**[0016]** A cylinder O-ring is mounted circumferentially on the cassette within the housing. A spring engages the housing and pivotally biases the cassette for easy removal of the cassette from the cam bore upon removal of the bushing at a tapered end. Accordingly, a new cassette can be inserted into the place and the tapered head bushing is then tapped with a tool such as a hammer. In this way, the cassette becomes fixed in the cam bore.

**[0017]** The cassette becomes fixed in the bore through the slightly smaller diameter of the bore inner surface interaction with the outer surface of the tapered head. This extremely tight pressure fit imparts the ability of a pump to withstand an exponential increase in the pressure created by fluid flow.

**[0018]** The invention is a cassette pump that inserts into a cam head receptacle. The cassette has a body with a tapered portion. An opposing intake portion of the tapered head faces an offset cam impeller. The tapered head of the cassette permits a self-sealing locking effect for the cassette. A check valve controls the direction of the pressure created.

**[0019]** In the preferred embodiment for the invention, the assembly is composed of PVC and bronze components. A bushing attaches to the tapered end of the cassette 10. The bushing abuts the pump body.

**[0020]** The present invention is being described in the context of a fluid pump. However it should be appreciated that the novel concepts of this invention have application to a wide variety of pumps for other fluids and equipment.

**[0021]** While certain preferred embodiments of the present invention have been disclosed in detail, it is to be understood that various modifications may be adopted without departing from the spirit of the invention or scope of the following claims.

What is claimed is:

1. A variable displacement pump comprising: a removable cassette assembly, fitted to a fitting hole within a pump casing so as to be movable and displaceable, forming a pump chamber with respect to an outer peripheral portion of the rotor: said cassette brought into slidable contact with one side of the casing: a high pressure chamber formed at a position facing to a discharge region of the pump chamber between a back surface of the pump casing; a low pressure chamber formed at a position facing a suction region of the pump chamber; and communicating with the suction region of the pump chamber; and at least two annular seal members, wherein the cassette is provided with a tapered head at a first end and a check valve at a second end.

2. A variable displacement pump as claimed in claim 1, wherein the high pressure chamber and the low pressure chamber are provided in a tapered manner in the pump housing of the pump casing.

3. A variable displacement pump as claimed in claim 1, wherein the low pressure chamber is communicated with the suction region of the pump chamber via a communication surface of the tapered head of the cassette, pierced in the

pump housing, and a lubricating fluid return path returning a fluid from a portion around the bearing of the pump shaft to the suction passage.

4. A variable displacement pump as claimed in claim 2, wherein the annular seal member is constituted by an O-ring.

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