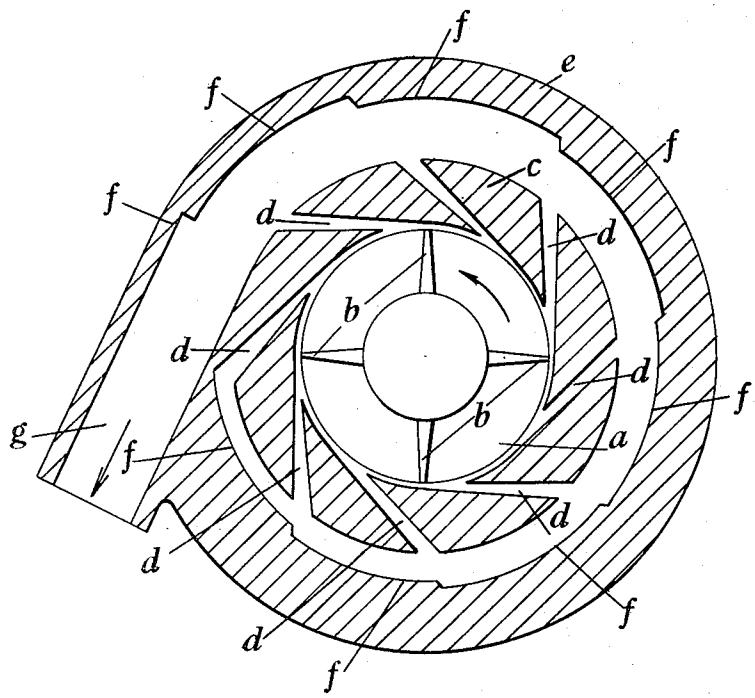
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CENTRIFUGAL PUMPS

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CENTRIFUGAL PUMPS

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1 Claim. (Cl. 103—103)

This invention relates to centrifugal pumps for pumping liquids, and more particularly pumps for supplying liquid fuel oil to jet propulsion engines, gas turbines or the like.

It has been found that when a pump of conventional form is run at a constant speed, and the outflow is controlled by a valve, the pressure of the discharged liquid varies in a capricious manner with variation of the rate of outflow.

The object of the present invention is to provide an improved pump which will obviate the aforesaid condition over a desired range of variation of the rate of outflow, which latter is controlled by a valve.

A pump embodying the invention comprises the combination of a rotary impeller, a diffuser ring surrounding the impeller and having therein a plurality of nozzle-like divergent passages the axes of which are substantially tangential to the periphery of the impeller, and a housing having therein a spiral chamber of stepped configuration, each step subtending an angular distance equal to the angular distance between the outlet ends of an adjacent pair of the said diffuser passages, the cross sectional area of the first step being equal to the area of the outlet end of the adjacent diffuser passage, and the cross sectional area of each of the other steps being equal to its number times the cross sectional area of the first step.

The accompanying drawing illustrates diagrammatically a typical embodiment of the invention.

Referring to the drawing, the rotary impeller *a* is provided with four equi-spaced radial vanes *b*. Around the impeller is mounted a fixed diffuser ring *c* having in it any convenient number of (for example eight) equi-spaced nozzle-like divergent passages *d*, the axes of which

are substantially tangential to the periphery of the impeller.

In the housing *e* is formed around the diffuser ring a spiral chamber consisting of a series of steps as *f* of progressively increasing radial depth. Each of the steps subtends an angular distance equal to the angular distance between the discharge ends of a pair of adjacent diffuser passages *d*, and the cross sectional area of the first step is equal to the area of the discharge end of the first diffuser passage. The cross sectional area of the second step is twice that of the first step, and that of the third step is three times that of the first step, and so on.

At its discharge end the spiral chamber is provided with a discharge passage. If desired, this passage may be made of divergent form to increase the pressure of the effluent liquid to the desired amount.

By the use of a diffuser and stepped spiral chamber as above described, liquid under the control of a valve can be discharged at a substantially uniform pressure over a wide range of variation of rate of flow.

The invention is not, however, limited to the example above described, as the number and shape of the vanes on the impeller, and the number of passages and steps in the diffuser and housing respectively may be varied to meet different requirements.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

A centrifugal pump for pumping liquids, comprising the combination of a rotary impeller, a diffuser ring surrounding the impeller and having therein a plurality of nozzle-like divergent passages the axes of which are substantially tangential to the periphery of the impeller, and a housing having therein a spiral chamber of stepped configuration, each step subtending an angular distance equal to the angular distance between the outlet ends of an adjacent pair of the said diffuser passages, the cross sectional area of the first step being equal to the area of the outlet end of the adjacent diffuser passage, and the cross sectional area of each of the other steps being equal to its number times the cross sectional area of the first step.

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