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TWIN PUMP DEVICE
Sixten Englesson, Djursholm, Sweden, assignor of one-half to AB Flygts Pumpar, Solna, Sweden
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The present invention relates to a pumping device comprising two centrifugal pumps mounted on a base structure having an open ended inlet part and an open ended coaxial outlet part and comprising further valve means, arranged between the two separate pumps and adapted automatically to close the passage through one of the pumps when only one pump unit is running.

Such pump devices are already known but they are impaired with a number of drawbacks. They are relatively heavy and must be supported by a common lifting up relatively large space.

Further in the known arrangement, the axes of the centrifugal pumps are arranged perpendicularly to the longitudinal axis of the base structure, and this results in conduits between the inlet and the outlet of the base structure which are not advantageous with respect to the path resistance.

Another drawback is that when casting the base structure in one piece complicated molds are necessary for the manufacture. A composite housing, on the other hand, requires accurate machining, and complicated mounting.

Finally it implies an essential disadvantage that the separate pumps, owing to their different directions of rotation, are not mutually replaceable. It is thus necessary to fabricate and to keep on stock two types of impellers.

The present invention has for its object to avoid the said disadvantages and to provide a centrifugal twin pump device which can be easily manufactured as a light unit and be built into a pipe line freely suspended in the same.

Further the invention has for its purpose to shape the pump device in such a way that the separate centrifugal pumps will be replaceable independent of the fact whether the pump is intended for the left hand or the right hand side of the base structure.

For this purpose the base structure according to the invention is provided with means allowing its mounting between two tube fittings and is also provided with two open ended branch channels connected to the inlet part of the base structure and forming an acute angle with its longitudinal axis, a pump chamber for a centrifugal pump impeller being connected coaxially to the end of each branch channel and a centrifugal pump unit including a motor and an impeller being further attached to each of said pump chambers, connecting channels being finally provided between said pump chambers and the outlet part of the base structure.

Another object of the invention is to form the volute chambers of the centrifugal pumps as rotary symmetrical chambers which results in a less complicated construction with a small weight.

In the following embodiment of the invention is described with reference to the annexed drawing showing a side elevational view of a pump device partially in section.

The pump device consists of a housing formed as a tube section 1 including volute chambers 2 and 3 for two centrifugal pumps 4 and 5. The tube section 1 is at its inlet and outlet openings 6 and 7 respectively provided with flanges 8 and 9 to make it possible to build in the device freely suspended in a conduit. Each pump unit 4 and 5 comprises a motor casing, which by means of an annular flange 10 and 11 respectively can be mounted on the common housing 1 so that the associated pump wheel 13 supported by the free end of the motor shaft 12 is brought in correct working condition in the volute chamber 2.

The axes of the volute chambers 2, 3 of the pump housing are oblique relative to the axis of the tube section 1 and are located perpendicularly to each other. Preferably the axes of the volute chambers 2, 3 are located in one and the same plane extending through the axis of the tube section even if with a good result these axes may be located each in a plane through the axis of the tube section but mutually forming an oblique angle. Moreover each volute chamber 2, 3 is shaped as a rotary symmetrical chamber provided with a central inlet 14 and a radial outlet 15, said chambers by means of branch channels 16 and 17 being in connection with the inlet 6 and the outlet 7 respectively of the tube section.

As is clearly apparent from the figure said branch channels 16 and 17 form together with each volute chamber, for instance the volute chamber 2 a substantially angle shaped channel forming a short stream-lined flow path resulting in an extremely simple mould.

The pump wheel 13 cooperates with a loose tube element 18 extending from the bottom of the volute chamber.

Said tube member 18 is preferably manufactured as a separate piece and secured to the central inlet opening 14 in the volute chamber.

Between the branch channels from the volute chambers 2 and 3 a valve plate 19 is pivotally mounted about a shaft located at the apex of the two branch channels 17, so that the valve plate 19 can alternately close the two opposite openings to the respective branch channels 17.

The valve plate 19 functions in such a manner that when one centrifugal pump works the fluid passage through the other pump is closed and when both pumps work the valve plate 19 takes up an intermediate position in which both pumps can work simultaneously.

By the arrangement according to the invention of the common housing it is further possible to install the valve plate 19 from outside through the outlet opening 7 and secure the plate 19 by means of a screw 20 serving as the pivot shaft for the plate 19.

Finally it should be noticed that by the invention one has obtained a twin pump device of as small weight as possible, said device being able to be freely suspended in a conduit system and the symmetrical shaping of the volute chamber does not only reduce the mass of material in the housing but also results in exchangeability of the pump unit independent of its location.

1. A centrifugal twin pump device, comprising in combination, a housing, said housing having two opposite open end sections provided with tube connection means, one end section serving as an inlet and the other as an outlet, said housing defining four open internal branch channels, two branch channels flaring outwardly in said housing from each of said open end sections, a right angle being formed between the two branch channels of each end section, the axes of the four branch channels forming a diamond shape, one branch channel of one open end section intersecting at right angle one branch channel of the other open end section, the open ends of said intersecting branch channels being enlarged to form a pump chamber for a centrifugal pump impeller, a centrifugal pump unit including a motor and an impeller disposed in each pump chamber and connected to the branch channels thereof, said housing defined by said branch channels and said pump units coinciding with the branch channels in the inlet open end section, and valve means operable for alternately closing one branch channel of an open end section.

2. A centrifugal twin pump device comprising in combination a base structure having an open ended inlet part
and an open ended coaxial outlet part as well as means allowing its mounting between two tube fittings and having also two open ended branch channels connected to the inlet part and forming an acute angle with its longitudinal axis, a pump chamber for a centrifugal pump impeller connected coaxially to the end of each branch channel, a centrifugal pump unit including a motor and an impeller attached to each of said pump chambers, connecting channels between said pump chambers and said outlet part and valve means adapted to close one of said connecting channels when only one pump unit is running.

3. A centrifugal twin pump device, as claimed in claim 2, said valve means comprising a valve plate swingably mounted in said outlet part between the orifices of said connecting channels in said outlet part so as to close alternatingly the one or the other of said connecting channels.

4. A centrifugal twin pump device, as claimed in claim 2, the axes of said pump units forming mutually a right angle.

5. A centrifugal twin pump device, as claimed in claim 2, and a loose tube section provided coaxially with each of said branch channels and extending into each of said pump chambers thus forming inlet means to said impellers.

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LAURENCE V. EFNER, Primary Examiner.