Nov. 1, 1949. W. C. HEATH 2,486,649

JET PUMP

Filed July 5, 1947

Fig. 1

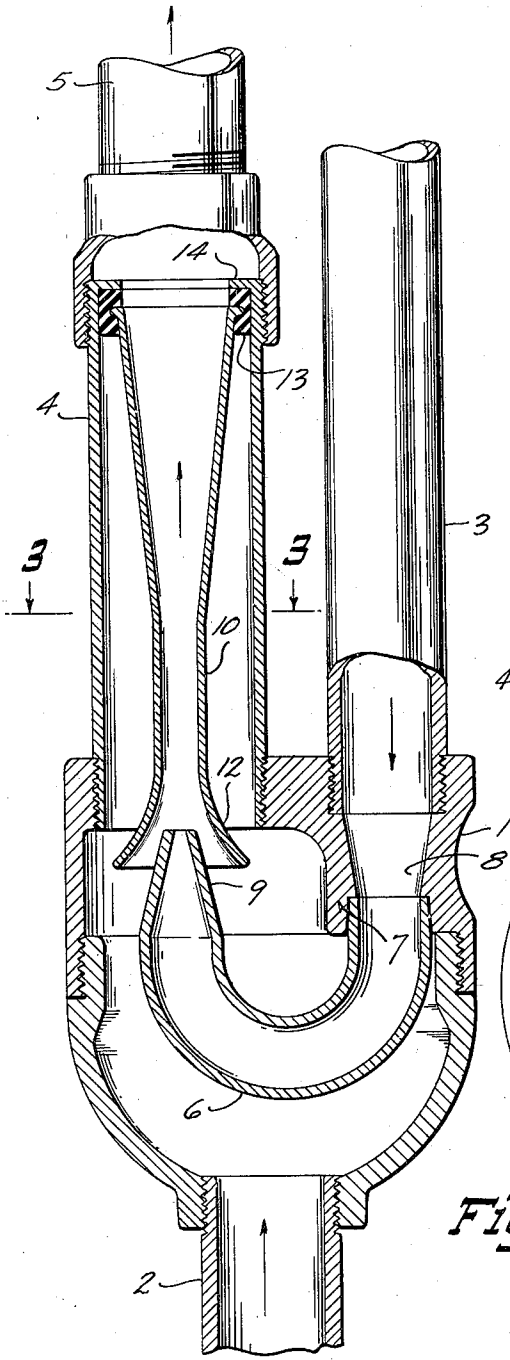
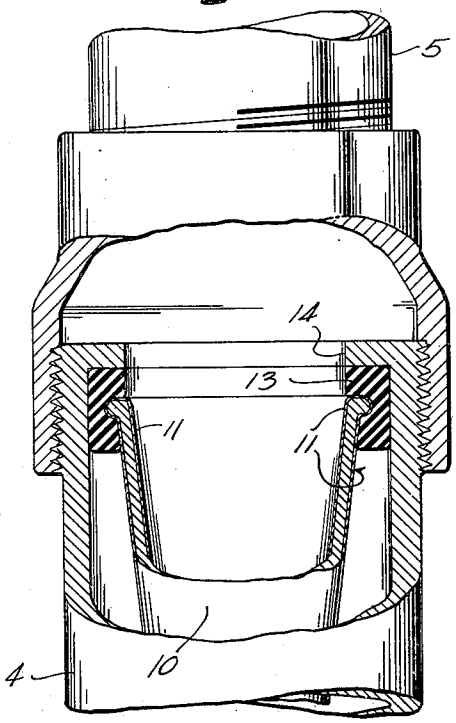


Fig. 2



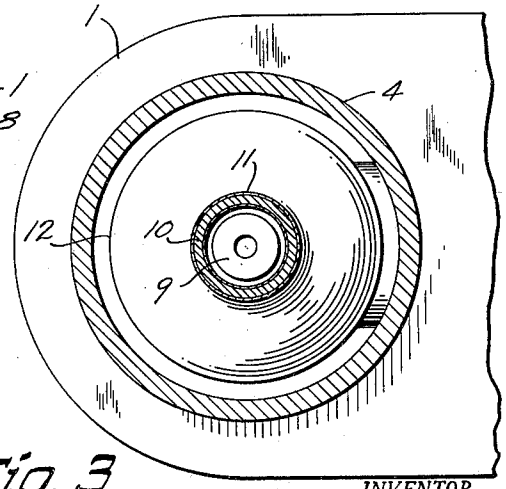


Fig. 3

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Patented Nov. 1, 1949 2,486,649

UNITED STATES PATENT OFFICE

2,486,649

JET PUMP

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Application July 5, 1947, Serial No. 759,198

4 Claims. (Cl. 103—260)

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This invention relates to a jet pump and has particular relation to the Venturi assembly for a jet pump.

One object of the invention is to provide a jet pump of increased efficiency.

Another object is to provide a jet pump in which the venturi centers itself relative to the jet of the pump to increase the efficiency of the venturi and pump.

A further object is to provide a jet pump with a glass coated generally lightweight metal venturi to improve the efficiency of the venturi and protect the same from corrosion.

These and other objects of the invention will appear hereinafter in connection with the following description of an embodiment of the invention illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a longitudinal section with parts in elevation of a pump to which the invention is applied;

Fig. 2 is an enlarged view illustrating the assembly of the Venturi tube in the pump; and

Fig. 3 is an enlarged section taken on line 3—3 of Fig. 1.

The jet pump shown in the drawing to illustrate the invention comprises a tubular body member 1 formed of two parts, with the lower part being cylindrical and terminating in a semi-spherical shape to form the base of the pump and the other part being generally cylindrical in shape and having a flat upper wall to close the upper portion of the body member.

The pumped liquid intake pipe 2 is threaded into the central part of the base portion of member 1. The power fluid pipe 3 and the Venturi housing 4 are threaded side by side into the flat upper wall of the upper part of member 1 substantially opposite to intake pipe 2 which extends into the well or other place from which fluid is to be pumped.

The discharged conduit 5 is threaded onto the upper end of housing 4 to carry off the discharged fluid from the pump as will be described.

The conduit 6 of a generally semi-circular shape is disposed inside body member 1. The inlet end of conduit 6 is brazed or welded to the boss or enlargement 7 of member 1 which is provided to support the conduit 6 and into which the power fluid pipe 3, previously described, is threaded. The conical shaped passage 8 is formed in boss 7 for transfer of the power fluid from pipe 3 to conduit 6.

The discharge end of conduit 6 comprises the nozzle 9 which is formed with a relatively long smooth passage of gradually decreasing cross section to eliminate turbulence and insure a smooth liquid jet issuing from the nozzle.

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The Venturi tube 10 which is assembled within Venturi housing 4 is of Venturi shape and formed from generally thin metal. Tube 10 is coated inside and out with ceramic enamel 11 to protect the tube from corrosion and to improve the efficiency of the tube in discharging the fluid flowing therethrough.

The inner or entry end 12 of tube 10 is flared to more readily receive the pumped fluid flowing through body member 1 and end 12 of the tube extends within body member 1 and surrounds nozzle 9 to receive the jet therefrom as well as the pumped fluid referred to.

The outer end of tube 10 is slightly flanged and is encircled by the resilient rubber member member 13 which may be vulcanized thereto. Member 13 engages the inwardly turned flange 14 on the end of Venturi housing 4 and is vulcanized to the flange as well as to the side wall of housing 4 encircling member 13 adjacent flange 14. The rubber member may be secured to housing 4 in other ways than by vulcanizing. The rubber also operates to seal the end of housing 4 to prevent the escape of fluid.

The remainder of tube 10 is radially spaced from housing 4 and body member 1 and being resiliently suspended the tube is free to center itself relative to the center of the jet of power fluid issuing from nozzle 9. Other structure than that described which leaves the tube free to swing for self centering, may be employed.

The upper end of tube 10 is aligned with discharge conduit 5 so that the tube discharges the fluid flowing through the pump into conduit 5 to be carried off thereby.

In assembling the venturi of the invention, where vulcanized rubber is employed, rubber member 13 is first vulcanized to the outer end of tube 10 after the tube has been coated with ceramic enamel 11.

The tube is then slipped into housing 4 until member 13 engages flange 14, and the end of the housing is heated to a suitable temperature to vulcanize the rubber flange 14 and the adjacent cylindrical end portion of the housing.

The housing 4, intake pipe 2 and power fluid pipe 3, are then threaded into the body member 1 within which conduit 6 has already been secured, and the discharge conduit 5 is threaded onto housing 4.

In operation, the power fluid flows through

pipe 3, passage 8, conduit 6, and then is discharged into Venturi tube 10 by nozzle 9 of conduit 6, in a relatively thin annular jet. As the jet of power fluid issues into tube 10, the fluid being pumped is sucked or drawn into the pump body 1 through intake pipe 2, and flows into flared end 12 of tube 10 around nozzle 9 to join with the jet of power fluid and be discharged through tube 10 and discharge conduit 5.

As the jet varies in service the Venturi tube is free to swing to center itself axially at all times relative to the jet. This minimizes friction and turbulence. In addition the ceramic enamel coating 11 on the inside of tube 10 provides a smooth unrestricted surface over which the pumped and power fluid flows, to combine with the free swinging and self centering of the Venturi tube and increase the efficiency of the venturi and the overall efficiency of the pump.

The pump has many uses and is particularly effective in handling gummy or oily or abrasive fluids.

Various embodiments of the invention may be employed within the scope of the accompanying claims.

I claim:

1. In a jet pump, a housing having separate intakes for power and pumped fluid and a discharge opening for the same, a Venturi tube disposed in said discharge opening of said housing, means in said pump housing disposed to eject a jet of power fluid into the inner end of said Venturi tube, and a substantially resilient mounting secured between the outer end of said housing and the outer end of said Venturi tube for supporting said tube and leaving the same free to float within the housing to center itself axially relative to the jet of power fluid discharged therein to increase the efficiency of the pump.

2. In a jet pump, a Venturi tube for carrying off the power and pumped fluid flowing through the pump for discharge therefrom, means in said pump for ejecting a jet of power fluid into the inner end of said Venturi tube, a housing surrounding said tube, and a substantially resilient mounting secured to the outer end of said housing and to the outer end of said Venturi tube for supporting the outer discharge end of said tube within said housing with the remainder of the tube radially spaced from said housing and free to float to center itself axially relative to the jet of power fluid discharged therein to increase the efficiency of the pump.

3. In a jet pump, a housing, a generally thin metal Venturi tube disposed in said housing for carrying off the power and pumped fluid flowing through the pump for discharge therefrom, a nozzle in said pump connected with the power fluid intake source and extending within the inner end of said Venturi tube for ejecting a jet of power fluid into said Venturi tube to suck the fluid to be pumped therethrough, a ceramic enamel coating on said Venturi tube protecting the same from corrosion and minimizing the friction losses of the fluid flowing therethrough, and a substantially resilient mounting secured within the outer end of said housing and to the outer end of the Venturi tube for supporting said tube and leaving the same free to float to center itself axially relative to the jet of power fluid discharged therein, the ceramic enamel coating of the tube and the floating of the same cooperating to increase the efficiency of the pump to a substantial extent.

4. In a jet pump, a Venturi tube for carrying off the power fluid and pumped fluid flowing through the pump for discharge therefrom, a nozzle disposed in said pump and connected with a power intake source for ejecting a jet of power fluid into said Venturi tube, a housing surrounding said tube, and a generally resilient rubber member vulcanized to the end portion of said tube and said housing to mount the tube therein with the remainder of the tube radially spaced from said housing and free to float to center itself axially relative to the jet of power fluid discharged therein to increase the efficiency of the pump.

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The following references are of record in the file of this patent:

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Certificate of Correction

Patent No. 2,486,649 November 1, 1949

WILLIAM C. HEATH

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 2, line 48, after the word "rubber" insert *to*;

and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 28th day of February, A. D. 1950.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.