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SHALLOW WELL CENTRIFUGAL PUMP WITH JET

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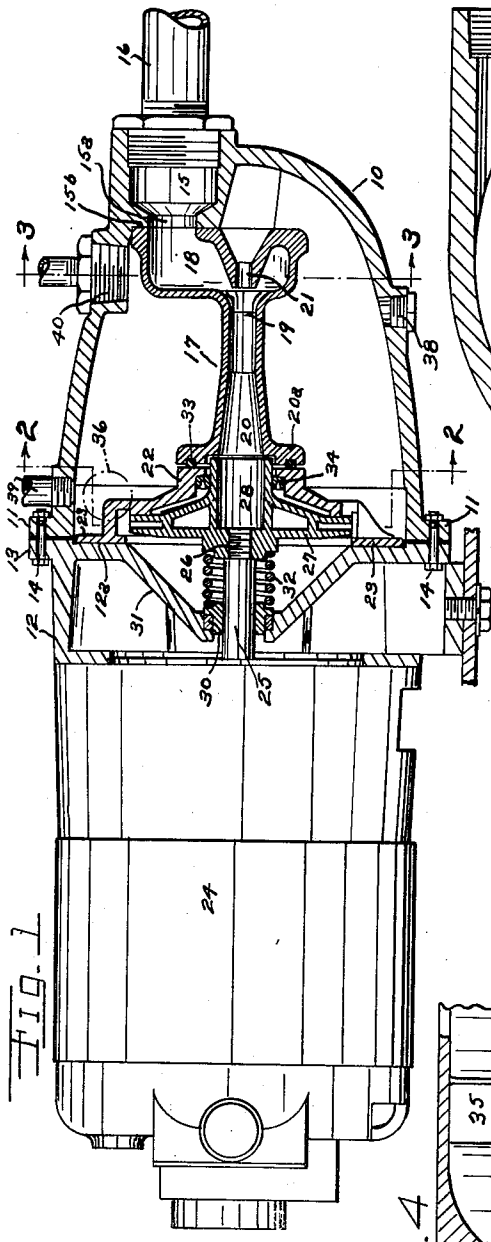


FIG. 1

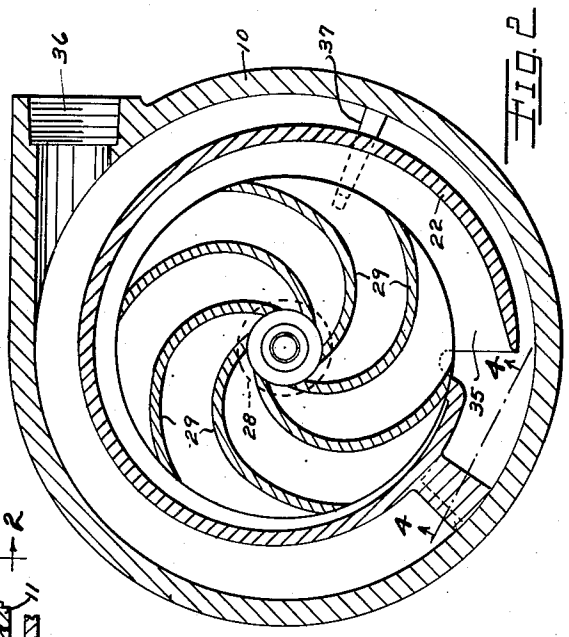


FIG. 2

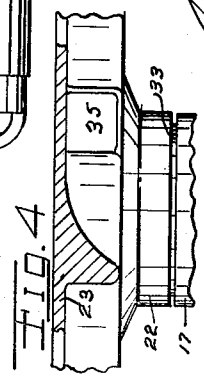


FIG. 4

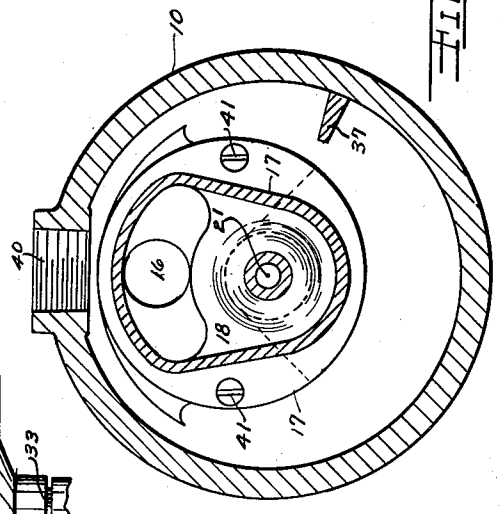


FIG. 3

INVENTOR.
EDWARD M. SMITH

BY

Hyde Meyer, Baldwin & Doran
ATTORNEYS

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SHALLOW WELL CENTRIFUGAL PUMP WITH JET

Edward M. Smith, Mansfield, Ohio, assignor to Barnes Manufacturing Co., Mansfield, Ohio, a corporation of Ohio

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1 Claim. (Cl. 103—5)

This invention relates to improvements in a centrifugal pump and jet combination unit in a type of pump known as the shallow well jet type.

One of the objects of the present invention is the provision of a pump of the type described requiring a small number of parts, a limited amount of machining, and providing a very efficient pump when assembled.

Another object of the present invention is to provide a pump of the type described of a limited number of parts calling for a minimum concern for sealing joints when the parts are assembled, and these parts are so constructed and arranged that the mere bolting of the main housing parts together suffices to hold the pump assembled.

A still further object of the present invention is to provide a pump of the type described wherein some of the liquid discharged from the volute outlet is recirculated through the main housing to the jet and wherein the interior surface of said housing and all other surfaces exposed to the recirculating liquid are maintained substantially unobstructed.

Other objects and advantages of my invention will be apparent from the accompanying drawings and description and the essential features will be set forth in the appended claim.

In the drawings—

Fig. 1 is a central sectional view through the pump and its housing with the driving motor shown in side elevational view;

Fig. 2 is an enlarged sectional view taken along the line 2—2 of Fig. 1;

Fig. 3 is an enlarged sectional view taken along the line 3—3 of Fig. 1; while

Fig. 4 is a fragmental sectional view taken along the line 4—4 of Fig. 2.

The main pump housing **10** is of generally bullet nose shape having a connecting flange **11** extending radially outwardly from the flared open end of the housing **10**. A motor base **12** is provided with a radially extending flange **13** which is bolted to the flange **11** when the parts are assembled by means of a plurality of bolts **14** of which four are used around the circumference in one form of my invention. Through the nose end of the housing **10** is provided an opening **15** into which is threaded a pipe **16** which serves for the purpose of introducing water to the pump from a shallow well or or other source of water. The opening at **15** is narrowed at **15***a* so as to provide a shoulder **15***b* against which rests the inlet end of an ejector **17** which comprises an inlet chamber **18**, a throat **19** and an expansion passageway **20**. Concentric with the throat **19** and spaced slightly therefrom in the usual manner is a jet **21** having an opening into the chamber of the housing **10**. The upper end of the ejector **17** abuts against a volute **22** which flares upwardly and outwardly to its outer rim where it is provided with a radially outwardly extending flange **23**. The motor base **12** is provided with a machined surface **12***a* which fits tightly against the surface of flange **23** which is machined to fit it. The motor **24** is provided with a driven shaft **25** which has a threaded connection at **26** with the centrifugal pump impeller **27**. This impeller has a hollow neck **28** which registers with the outlet passageway **20** of the ejector. The impeller is provided with the usual series of vanes **29**. The shaft **25** is provided with a seal **30** which is held in a truncated conical collar **31** which is rigid with the motor base **12**. A helical compression spring **32** between the impeller **27** and the seal **30** holds the latter in place.

Means is provided to seal the end of the ejector **17** against the volute **22**. This means comprises an annular ring of sealing gasket material **33** received in an annular groove in the flange **20***a* at the discharge end of the ejector. This sealing ring is pulled up against the volute **22** when the parts are assembled thus providing a good seal at this point.

Means is provided to prevent leakage around the neck **28** of the impeller. This comprises an annular seal of flexible material U-shape in section as indicated at **34**. This seal has its lips or legs slightly compressed between the neck **28** and the volute **22** thus providing a good seal at this point.

The discharge from the volute **22** is at the point **35** which discharges the liquid into the housing **10** tangentially. A large portion of the discharge liquid travels around the housing **10** to the discharge **36**. This discharge is not properly to be seen in Fig. 1 of the drawings but its approximate location on the near side of the body **10** is indicated by the dot-dash lines **36** in Fig. 1.

To deaerate the liquid in the housing **10**, a fin **37** is provided extending radially inwardly from one side of the housing **10** and extending from a point near the nose of the housing to a point near the volute **22** at the other end of the housing. This fin **37** breaks up the flow of the liquid in its circular path inside of the housing **10** so as to release air bubbles therefrom.

Several openings are shown in the sides of the housing **10** and these include a drain **38** closed by a plug; a connection at **39** which leads to a pressure switch which is used to control motor **24**; and another opening at **40** to which is normally connected a pressure gauge and which is provided with a reducing bushing which can be removed for the purpose of priming the pump when necessary.

It will be understood that means not shown is provided for energizing the motor **24** so as to drive the impeller **27**.

In assembling the pump, the ejector **17** is assembled in the nose end of the housing **10** by means of cap screws **41**. The volute **22** is then placed against the sealing ring **33** of the ejector. The motor shaft **25** is passed through the opening in the frusto conical collar **31** and the impeller **27** is threaded to the end **26** of the shaft. The spring **32** is inserted while the impeller is being threaded in position so as to hold the seal **30** in place. The motor base **12** is then connected to the flange **11** by means of the bolts **14** and this holds the parts **10**, **17** and **22** in the positions shown in Fig. 1 tightly against the motor base surface **12***a*. It will be noted that flange **20***a* provides a shoulder extending radially from the axis of the ejector. This shoulder abuts a similar shoulder on volute **22**. When housing **10** is secured to base **12**, these two shoulders are pulled tight against each other with sealing ring **33** between them. The ejector **17** and volute **22** are then held in abutting relationship between the housing **10** and the base **12**.

By means of the above construction the number of parts is held to a small number and the pump is easily assembled and disassembled by manipulation of the bolts **14**.

What I claim is:

In a pump of the class described, a motor having a driven shaft, a base supporting said motor, a pump impeller mounted on said shaft for rotation thereby, a volute surrounding said impeller and abutting said base, said volute having a central inlet and a peripheral outlet, a one-piece ejector having a jet and a delivery passage in registry with said volute inlet, said ejector and volute having mutually abutting shoulders extending radially from the axis of said ejector, there being liquid sealing means between said shoulders, said ejector having an inlet offset from said jet, housing means including a hollow main pump housing open at one end and having a liquid inlet at the opposite end, there being a pressure liquid outlet in said housing near said open end, said housing abutting said ejector with said housing liquid inlet in register with said ejector inlet, said volute outlet and said jet communicating with the hollow of

said housing, means securing said housing to said base with said ejector and volute held between said housing and base in abutting relationship, said volute and base closing said open end of said housing, whereby said base becomes part of said housing means, said volute having its periphery substantially in engagement with said housing means, said ejector secured to said housing at the liquid inlet end of said housing, and the securement between said ejector, volute and base consisting of said securing means maintaining the abutting relationship between said ejector and sealing means against said volute, and between said volute and said base.

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