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Sjostrand

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[54] **SYSTEM FOR COUPLING PUMP UNITS TO OUTLETS UNDER WATER**

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[52] **U.S. Cl.** **222/180;** 417/360; 285/24

[51] **Int. Cl.** **F04b 17/00**

[58] **Field of Search** 285/24, 27, 18, 326, 325; 222/180; 415/126; 417/360, 361

[56] **References Cited**

UNITED STATES PATENTS

3,018,925	1/1962	Englesson	222/180
3,635,606	1/1972	Blum	417/360
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German printed application, 10/1971, Blum, 3 sht. dwg., 14 pp. spec.

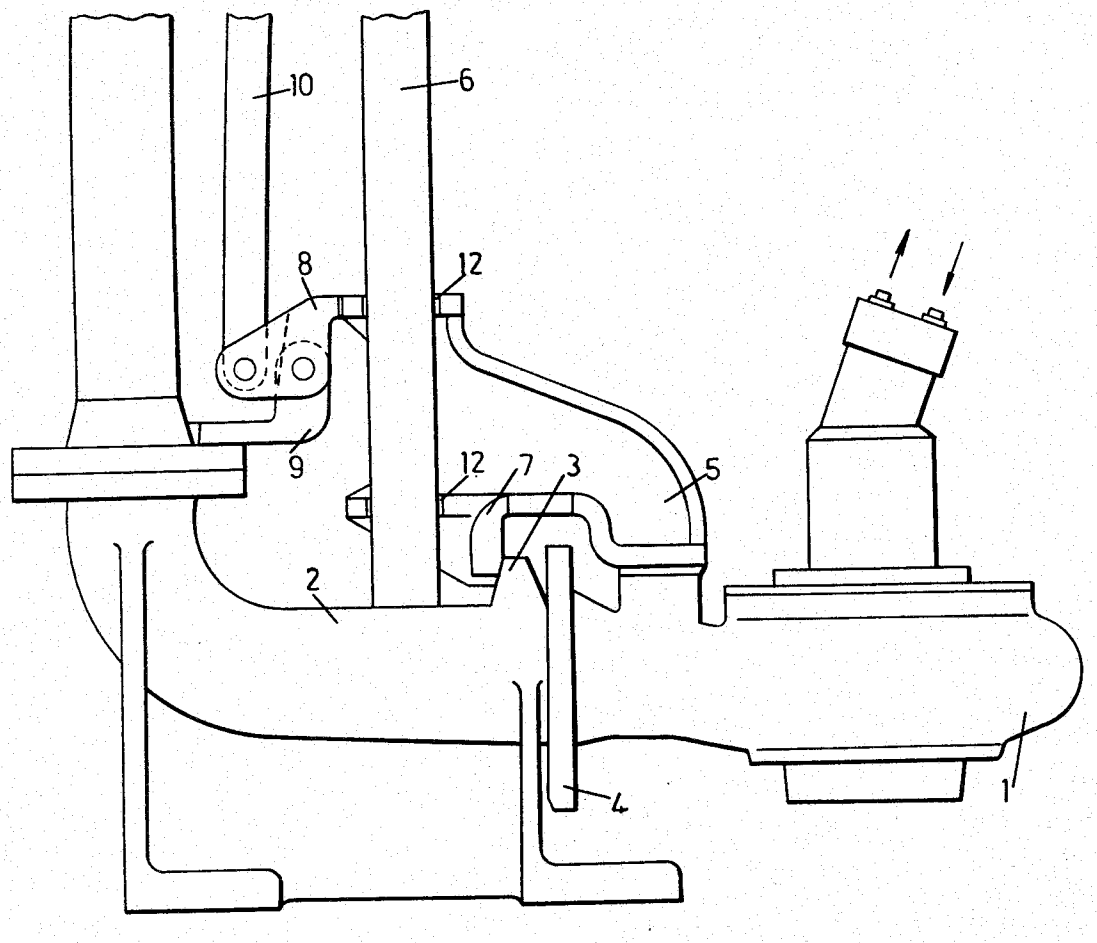
Primary Examiner—Andrew V. Kundrat

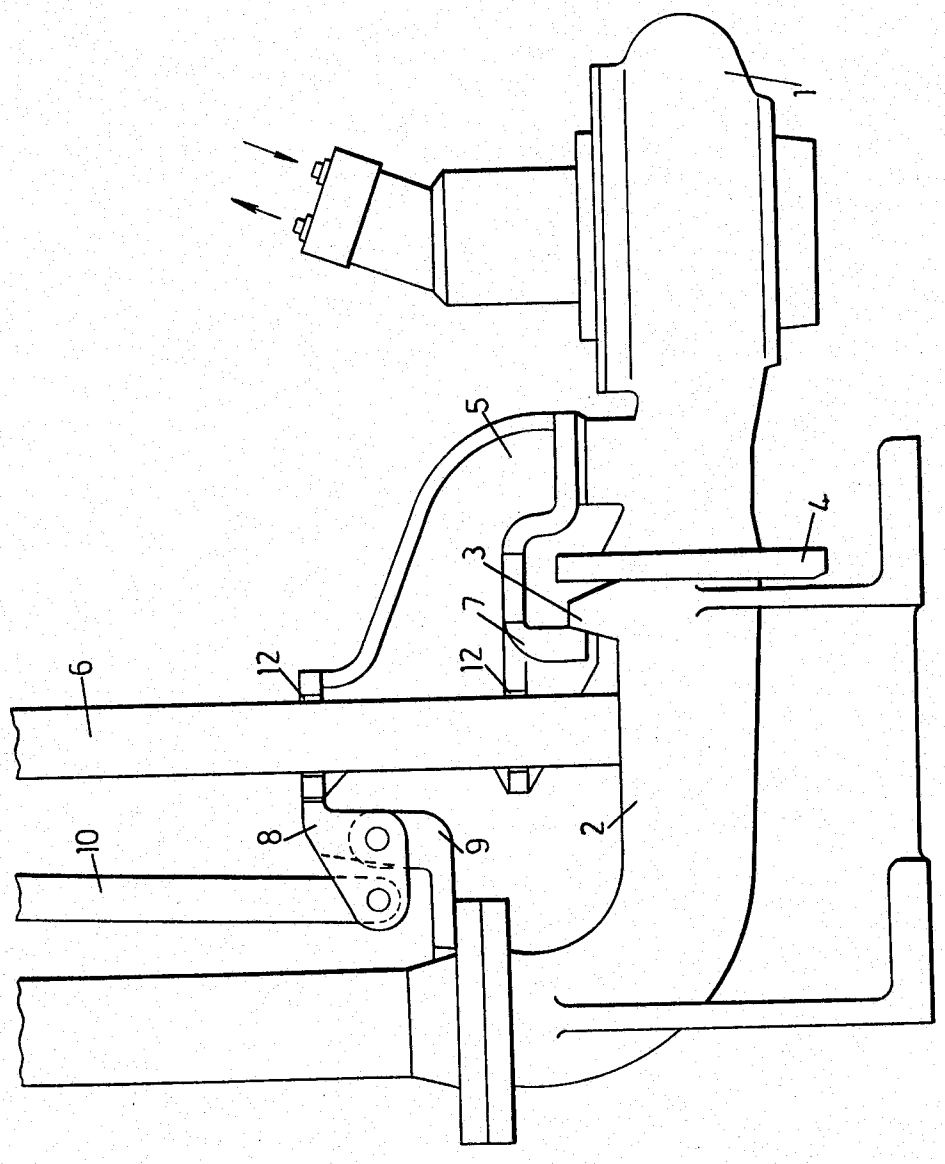
Attorney, Agent, or Firm—James B. Raden; Delbert B. Warner

[57] **ABSTRACT**

A system is disclosed for placing sewage disposal pumps into contact with outlet pipes without attaching the pumps to the pipes with bolts and the like. The pumps can then be removed for maintenance work and replaced without extending tools underwater to release or secure bolts. A locking pawl is placed on the outlet pipe which can be operated from a point above the water surface and which in one position locks the pump against its guides thereby to secure contact between the pump and the outlet pipe.

6 Claims, 1 Drawing Figure




1
5
4
3
7
12
12
6
8
9
2
10

SYSTEM FOR COUPLING PUMP UNITS TO OUTLETS UNDER WATER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a locking device for a sealed pump unit such that the pump unit may be immersed in a liquid while being installed on, or removed from, an outlet pipe therein. It relates particularly to fastening and releasing coupling between a flanged outlet of a pump unit and an outlet pipe under water, and involves the use of means for applying and releasing a retaining force between a flange on the pump unit and a flange on the outlet pipe.

2. Description of the Prior Art

With pump units which are meant to work entirely or partly immersed in liquid there is a great inconvenience in maintenance work if the pump units are permanently installed. In order to solve these problems it is a known practice to arrange for the pump units to be lowered into the pumped medium guided along guides and, in their lowered position bearing against a rigidly arranged outlet pipe for the pumped liquid. The connection of the pump unit must in this position close tightly against the outlet pipe without needing to be attached to it by screws or the like.

These known devices admittedly enable the pump unit to be easily raised out of the pumped medium for maintenance work, but certain problems may occur as difficulties to get the connection of the pump unit to close tightly against the outlet pipe during pump operation when a force occurs which endeavors to part the two coupling devices.

This problem has up to now been solved by forming the coupling units so that the gravity of the pump unit compensates and overcomes the named force. An example of such a locking device is shown in the U.S. Pat. No. 3,018,925.

With the actual development of lighter pump units and the use of increasing power for pumps, the pull of gravity sometimes is not sufficient to keep the pump unit down. This is especially the case with hydraulic motor driven pumps for instance, where the motor unit built together with the pump is very light and at the same time the pump power is often very high. The leakage which occurs between the coupling devices may cause a considerable decrease in efficiency.

SUMMARY OF THE INVENTION

In view of the foregoing, it is an object of the invention to provide the coupling units with a locking device which works when the pump unit is in operation and which locking function, when necessary, may be released in a simple way.

According to the invention the above mentioned object and objects collateral thereto have been attained by arranging a pivotedly suspended locking pawl on the outlet pipe, which pawl is operated from a point above the water surface and which, when securing the pump unit, presses the upper part of the pump unit's guide means, turned away from the unit, in a direction towards the guides, whereby the unit is pressed firmly against the outlet pipe.

BRIEF DESCRIPTION OF THE DRAWING

The FIGURE shows an arrangement of elements in accordance with an embodiment of the invention.

DESCRIPTION OF A PREFERRED EMBODIMENT

In the drawing **1** and **2** stand for a pump unit and an outlet pipe respectively and **3** and **4** their coupling units. **5** stands for a guide means rigidly arranged on the pump unit, which means during lowering of the pump unit is meant to slide along the guides **6. 7** stands for a clutch arranged on the guide means **5, 8** stands for a locking pawl which is fixed to the outlet pipe **2** by the unit **9** and **10** finally stands for an operation device for the locking pawl **8.**

The locking device works as follows:

When the pump unit **1** is lowered to its working position, it is guided by the guide means **5** which partly encircles the guide **6.** In order to assure better guidance, it is common to use two guides which cannot be seen in the drawing. When the pump unit has reached its working position, the clutch **7,** arranged on the guide means **5,** will grip over the flange **3** of the outlet pipe **2,** so that the coupling units, flanges **3** and **4,** automatically come into the right position relative to each other.

Due to the fact that a certain play in the sleeve opening **12,** between the guide means **5** and the guide **6** is necessary, the pump unit has the possibility to release a little from its contact with the outlet pipe **2** caused by the reaction force mentioned above. In order to eliminate that risk, a locking pawl **8** has been arranged pivotedly attached to a suspender **9** which is rigidly attached to the outlet pipe **2.** The locking pawl **8** is turnable between different positions by help of an operation unit **10.** In one position the pawl is pressed against the upper part of the guide means **5** in such a way (to the right in the drawing) that the guide means **5** and the pump unit **1** are prevented from turning upwards around the suspension point. At another position of the pawl **8,** it is free from the guide means **5** and the pump unit **1** is then loose and free to be lifted up for service. The operation of the pawl **8** is carried out by dislocation of the operating bar **10** longitudinally, provided that the upper part of the bar **10** always is above the water surface.

The invention disclosed is a locking device for a submersible pump unit which is simple and strong and easy to operate and which is not affected by pollutants which occur in the pumped water.

While the principles of the invention have been described above in connection with specific apparatus and applications, it is to be understood that this description is made only by way of example and not as a limitation on the scope of the invention.

I claim:

1. A locking device for submersible pumps arranged as a releasable connection between a pump unit and a usually submerged outlet pipe, comprising guide means attached to a pump unit, said guide means including spaced upper and lower sleeve adapted to slide along a substantially vertical guide when a pump unit is being lowered or raised, a locking pawl, means for operating said locking pawl from a position above a water surface when said pump unit is submerged, said locking pawl including means engaging said upper sleeve for securing the pump unit by pressing the upper sleeve against one side of the substantially vertical guide while pressing the lower sleeve against the opposite side of the vertical guide to rotate the guide means and press the pump unit securely against the outlet pipe.

2. A device according to claim 1, in which means are provided by which the locking pawl is pivotedly attached to the outlet pipe.

3. A device according to claim 2, in which the locking pawl is operated from a point above the water surface by means of an operating device.

4. A device according to claim 3, in which the operating device includes a bar having one end attached to the locking pawl and the other end extending above the water to enable a force to be applied from above the water to cause the pawl to rotate and control pressure applied by the pawl to the guide means.

5. A device according to claim 1, in which suspender means are provided to pivotably support said locking pawl, and said suspender means are rigidly supported by an outlet pipe.

6. The invention as claimed in claim 1, in which the outlet pipe includes a coupling unit and the guide means includes a clutch to engage said coupling unit, said clutch and coupling unit in cooperation with the lower sleeve opening serving as a pivot for the pump unit and guide means when the locking pawl presses the upper sleeve opening against the vertical guide.

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