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(54) Title: ADJUSTABLE SYSTEM FOR PUMPING WATER WITH SELF-PRIMING PUMP

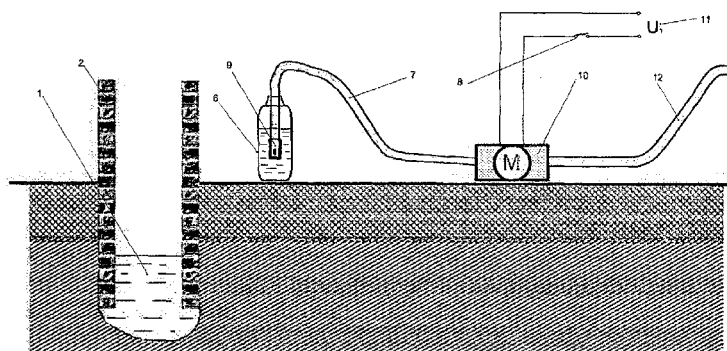


Fig 3.

(57) Abstract: Adjustable system for pumping water with self-priming pump consists of check valve (9), flexible plastic hose (7), water container (6), pump (10), power supply (16), drain hose (12) and it is necessary to fill the hose (7) with water over the switch (8) before exploitation and then lower the full system into the well (1).



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ADJUSTABLE SYSTEM FOR PUMPING WATER WITH SELF-PRIMING PUMP

TECHNICAL FIELD

Generally looking this invention falls into the area of applied Electrical Engineering or the area of electrical machines whereby the subject of this invention impinges the area of civil engineering or mechanical engineering.

TECHNICAL PROBLEM

Technical problem which is solved with this invention consists of: Water deflation from great depth, greater than declaratory depth of self-priming pump without the system for exhausting the air using diaphragmatic pumps of lower power.

TECHNICAL BACKGROUND

Self-priming pump can pull water from the depth of one meter without the system. There is a well-known system with hand pump and its check valve for water deflation from great depth up to 10 meters which branches out with the pump pipe. Air is very compressible and classical diaphragmatic self-priming pumps cannot create vacuum of sufficiently low pressure so we use hand pump for pulling out the air from the pipes which leads water to the pump.

SUMMARY OF INVENTION

The essence of invention is that adjustable system for pumping water with self-priming pump consists of check valve which is attached to one end of the flexible plastic hose. The other end of the flexible plastic hose is attached to the diaphragmatic pump of lower power. The pump is connected by switch to the power source which can be alternating or direct or solar panel. The pump is also connected to the drain hose. Inlet hose which at its beginning is connected to the check valve has to be flexible and made of harder plastic so that the hose would not be deformed when the pump is started. The pump has to have enough power more exactly to create vacuum in the hose or pressure which is low enough for opening the check valve. The self-priming pump can pull water from 1 meter depth without the system. When you start the pump check valve opens and sucks residual air from hose. Motor or pump has not got enough power to pull water several dozen meters because air is compressible but it has got enough power to pull water from the low height because the difference of air pressure is several centimeters higher at the entrance ρgh in other words density times

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gravitational constant times height . Awhile pump starts to pull water after some time there is a squirt at the exit. Hose is full with water now. You should turn off the pump now. It is impossible for water to drain because of the check valve. You should lower the hose into the well or the pipe of hand pump and then start the pump if it is necessary. The system is marked with two phases, the first one is charging hose with water and the second one is inserting hose into well and exploitation. There is no need for fixed pipes and there is no plumbing, no hand pump and it is suitable for irrigation in agriculture. In addition with solar panel this system is adequate replacement for petrol pumps.

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1. represents cross section of the well

Fig.2. represents cross section of the well under the hand pump

Fig. 3. represents intake of water

Fig. 4. represents the system when it is full of water and ready for work above the well

Fig.5. represents the system when it is full of water and ready for work above the well with the dismantled hand pump

Fig.6. represents completed system before installation

Fig.7. represents completed cross section of flexible plastic hose which is plunged into water with the check valve altogether.

Fig.8. represents cross section of flexible plastic hose.

DISCLOSURE OF THE INVENTION

Fig.1 and 2 show cross sections of the well. Mark (1) stands for the level of water in the well and mark (2) is the wall of the well. In the Fig.2 mark (2) stands for the level of water under the hand pump, mark (3) are the pipe holes of hand pump, (4) marks the pump pipe and (5) marks hand pump. The hand pump is totally unnecessary when you apply Adjustable system for pumping water with self-priming pump so you should dismantle the hand pump. The pipe is fixed in the ground and you do not make any changes on it.

Fig.3 shows how the system looks and procedure of filling the plastic hose (7) with water. Procedure of filling the hose with water is described in the following way. Starting the pump (10) by pulling the switch (8),check valve(9) is

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opened and pump sucks residual air from hose. Motor or pump (10) start to suck in water from water container (6) because the difference of air pressure is several centimeters higher at the entrance ρgh in other words density times gravitational constant times height of several cm. Awhile pump starts to pull water after some time there is a squirt at the exit. Hose (7) is full with water now. You should turn off the pump (10) now over the switch (8). It is impossible for water to drain because of the check valve (8). You should lower the hose into the well (1) or the pipe of hand pump (4) and then start the pump if it is necessary (8). The system is marked with two phases, the first one is charging hose with water and the second one is inserting hose into well and exploitation.

In the Fig.3 water container (6) from a few liters is at level with the pump (10) and it can be raised several centimeters. You put the front end of the hose (7) in the container altogether with the check valve (9). The other end of the hose is connected to the pump (10) and the other end of the pipe is connected to the outlet hose (12) which does not have to be made from the same material as inlet hose (7). The pump is connected to the power source U1 (11) by cable and switch(8). You can use solar panel (16) as a power source. You should lower the system into the well (1) or the hand pump pipe Fig. 2 when it is full with water .After that the system is for work. You use switch (8) to turn on and off the system. Fig.4 and 5 show the hose (7) when it is lowered into the well (1) or hand pump pipe (4). Solar panel (16) is used as a power source Electrical voltage U1 (11) of the system. Power of solar panels is small so it is possible to use low power pumps. Depending on the type of solar panel and pump type it is sometimes necessary break the electrical voltage of the pump and the simplest way to do this is by adding several rectifier diodes in line with the switch because we know that diode voltage drop is 0.7V.

Fig.6 shows the look of the system after assembly. The check valve (9) is hitched at the beginning of the flexible plastic hose (7). The hose is connected to the pump (10) at the other end. The pump is also connected to the outlet hose (12). The pump is powered by switch(8) or by solar panel (16). Fig.7 shows cross section of the check valve (9) and flexible plastic hose (7). One part of check valve (13) is hitched with spring (14). The second part of the spring pushes the rubber cylinder (15) which altogether with this part of the valve (16) do not allow water to return. Direction of the check valve is from free end to the hose (7).

Fig.8 shows cross section of the flexible plastic hose (7) which is hollow from inside and it is filled with air or water.

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INDUSTRIAL OR ANOTHER USE OF INVENTION

Adjustable system for pumping water with self-priming pump is (picture 6) altogether with container (6) and solar panel (16) suitable for irrigation of smaller areas in agriculture. There is no need for plumbing and system is movable so it is possible to dismantle it during the winter.

CLAIMS

1. Adjustable system for pumping water with self-priming pump is **characterized by** that the check valve (9) is connected to the flexible plastic hose (7) which is at the other end connected to the pump (10) with the container (6) at pump level and switch (8) with the help of power supply (11) fills the hose with water (7)(12) which is lowered into the well when it is full.
2. Movable system for water deflation with self-priming pump according to the request 1 and variants 4,5 is **characterized by** that it is powered (11) from the solar panel (16).

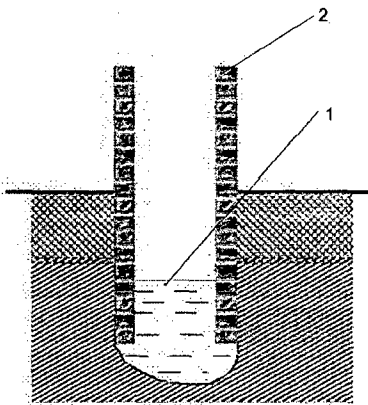


Fig 1.

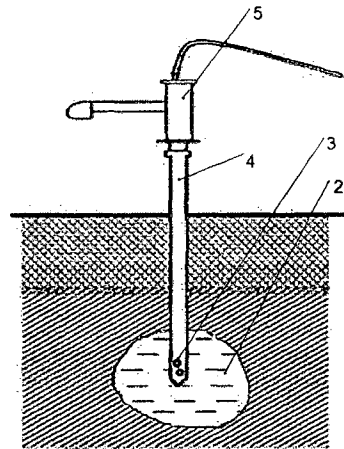


Fig 2.

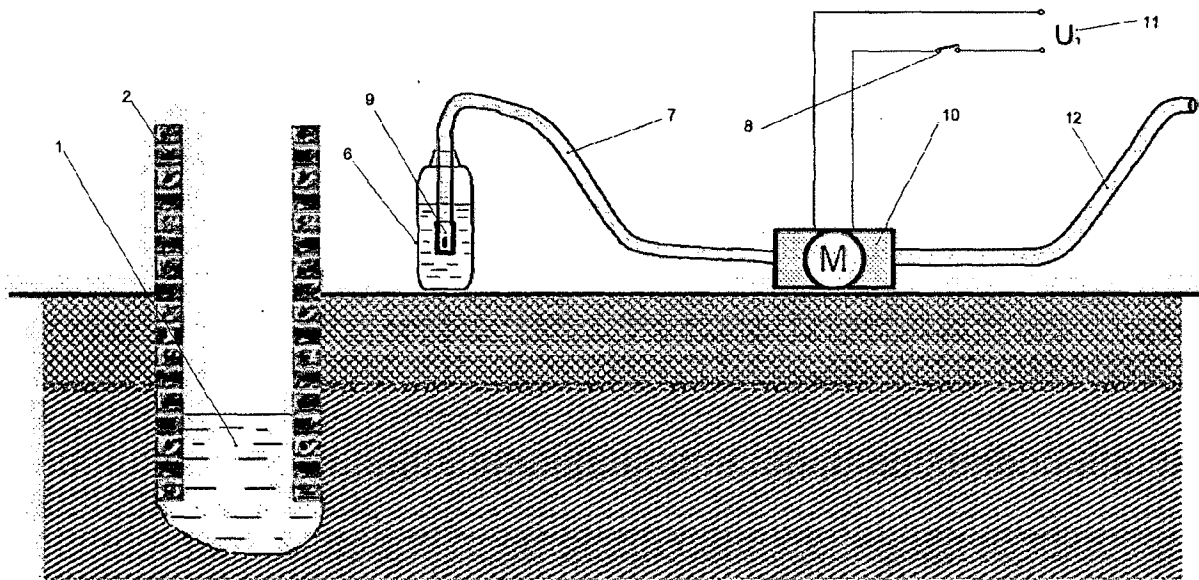


Fig 3.

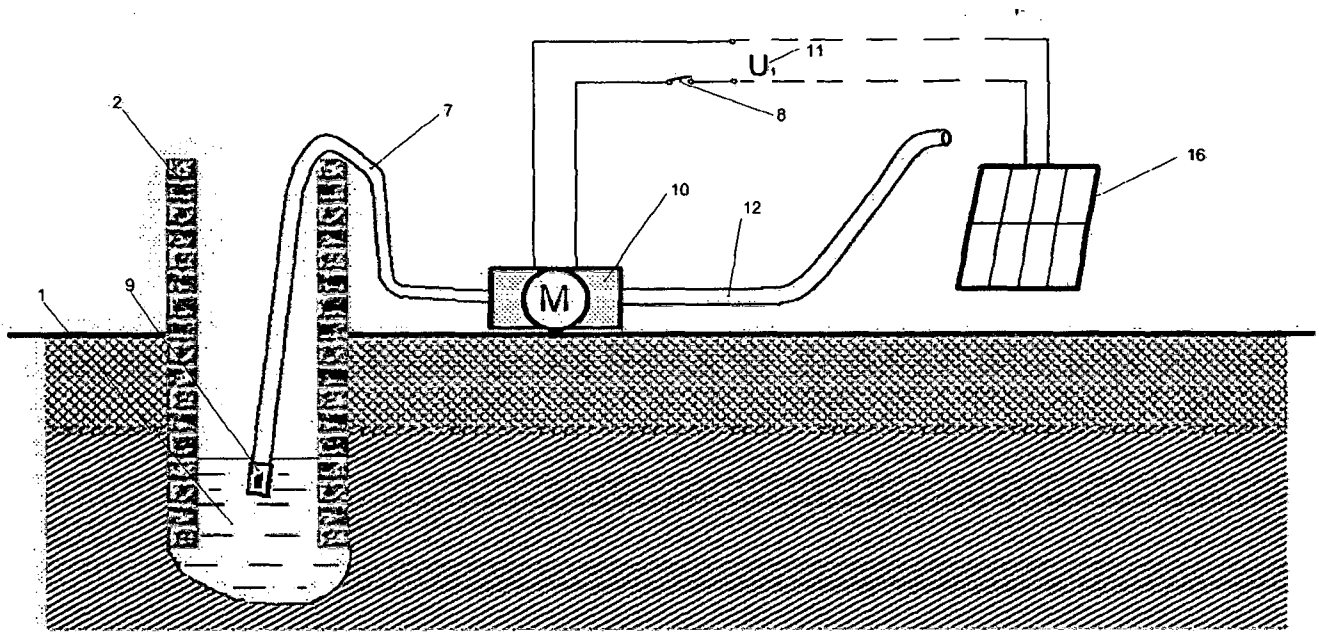


Fig 4.

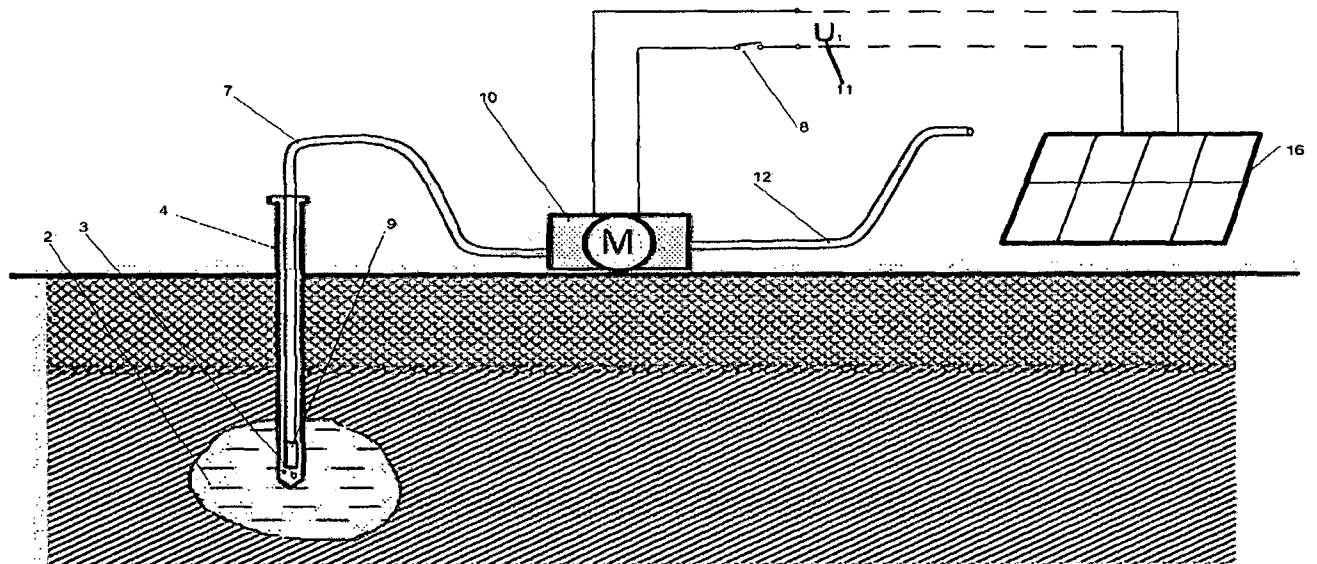


Fig 5.

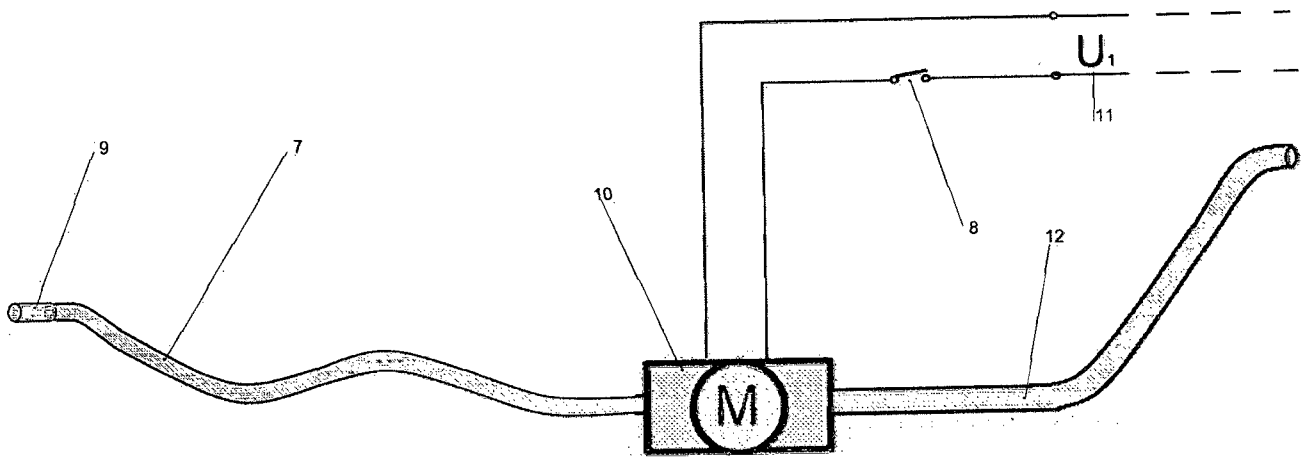


Fig 6.

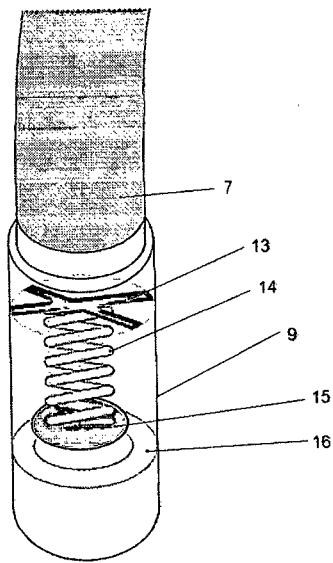


Fig 7.

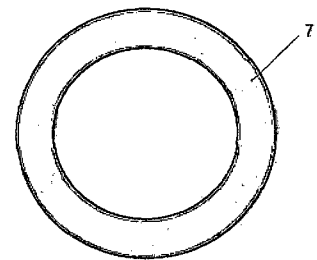


Fig 8.

INTERNATIONAL SEARCH REPORT

International application No
PCT/RS2015/000018

A. CLASSIFICATION OF SUBJECT MATTER

INV. E03B5/04 F04B17/06 F04D9/00 F04B47/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E03B F04B F04D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 43 31 955 A1 (ZIEGLER HERMANN [DE]) 30 March 1995 (1995-03-30) the whole document column 2, line 8 - line 38 column 2, line 65 - line 68 column 3, line 39 - line 52 column 5, line 44 - line 61 column 6, line 47 - line 52 -----	1,2
A	US 5 246 350 A (LACKSTROM DAVID [US] ET AL) 21 September 1993 (1993-09-21) the whole document -----	2
A	AT 391 789 B (KLOIMWIDER MICHAEL ERIK [AT]) 26 November 1990 (1990-11-26) the whole document page 1, line 6 - line 7 page 2, line 28 - line 30 ----- -/-	1,2

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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INTERNATIONAL SEARCH REPORT

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 420 277 C (BASILE KAMENSKY) 7 June 1926 (1926-06-07) the whole document page 2, line 6 - line 17 -----	1
A	SU 901 638 A1 (OSOBOE K B POZHARNYKH MASHIN [SU]) 30 January 1982 (1982-01-30) abstract figure 1 -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 4331955	A1	30-03-1995	NONE	

US 5246350	A	21-09-1993	NONE	

AT 391789	B	26-11-1990	NONE	

DE 420277	C	07-06-1926	NONE	

SU 901638	A1	30-01-1982	NONE	
