

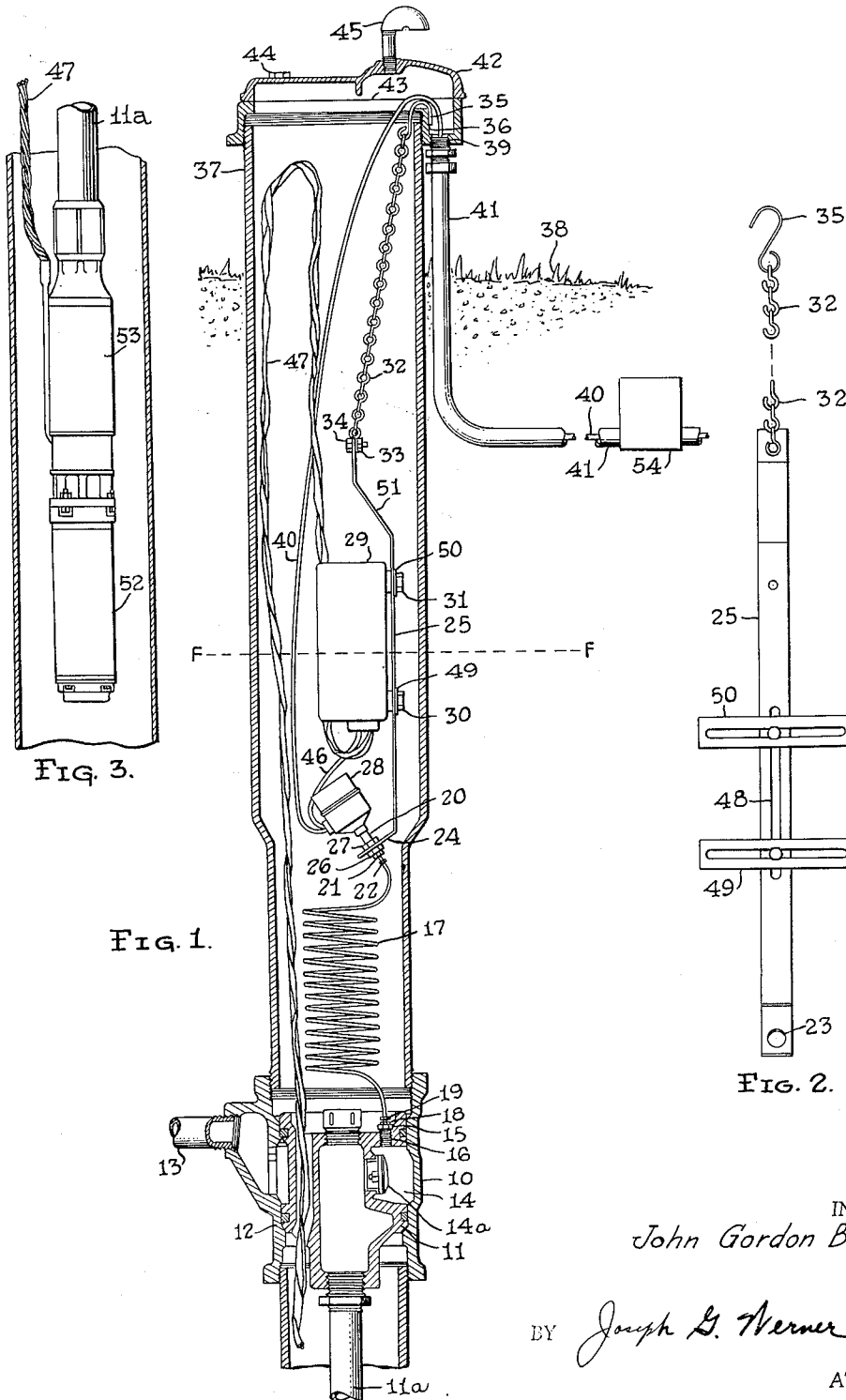
Sept. 11, 1962

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3,054,022

MOTOR CONTROLS FOR WELL PUMPS

Filed Nov. 3, 1958



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3,054,022

MOTOR CONTROLS FOR WELL PUMPS

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Filed Nov. 3, 1958, Ser. No. 771,431

4 Claims. (Cl. 317-99)

This invention relates to motor controls for well pumps, and particularly to apparatus for locating motor controls within the well casing of a well pump of the so-called pitless type.

Pitless pump installations generally have the pressure tank for the system located in the dwelling or other building served by the pump. Usually the pressure switch and the motor control box, when used, for the system have been located in such dwelling or other building to prevent freezing of the pressure switch, to maintain a tolerable range of temperature for the control box, and for easy accessibility for servicing.

The location of the pressure switch and control box in the dwelling or other building near the pressure tank has several disadvantages. Such a system is often more expensive to install, especially where the distance is substantial and buried cable is required. Maintenance is likewise greater where the controls are at a place remote from the well because wiring difficulties require more service calls because of the lengthy cable and sometimes require digging up the underground cable for repairs. Moreover, when the pressure switch and control box are located in the dwelling or other building, they and the wiring are subject to damage by fire in the dwelling, and thus the water supply may be cut off at the well when the water is most needed to combat the fire.

Where pressure switches and controls have been located at or near the well they have been generally outside the casing of the pitless units above ground level, with the result that they are generally subject to extreme temperature conditions, requiring heating or other extra provisions to avoid the detrimental effects of such extreme temperatures.

It is an object of my invention to locate the pressure switch and the control box when used, inside the casing of the well.

It is a further object of my invention to provide means for readily raising the pressure switch and the control box to the top of the well for adjustments or repair, and for lowering the same, without pulling up the pump or water conducting components.

Another object of my invention is to protect the pressure switch and control box from extreme changes of temperature and to locate the pressure switch below the frost line within the well.

A still further object of my invention is to aid in the isolation of sudden water pressure changes, due to the starting and stopping of the pump, from the pressure switch.

Other objects and advantages of my invention will be apparent from the following description and the accompanying drawings, wherein:

FIG. 1 is a fragmentary vertical section through a portion of a pitless pump installation showing a preferred embodiment of the novel features of the present invention.

FIG. 2 is an elevational view of the mounting panel of the invention with the attached chain and mounting hook.

FIG. 3 is a fragmentary vertical section through a lower portion of the pitless pump installation of FIG. 1 showing the suspension of the pump and motor.

My improvement may be used with conventional pit-

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less installations, provided the inside diameter of the well casing is adequate to receive the pressure switch and control box, when used. For example, the well unit generally designated as 10 may incorporate the spool 11, drop pipe 11a supporting the pump 53 and motor 52, and discharge body 12, with outlet 13 to pressure tank, of the pump construction of Baker et al. U.S. Patent No. 2,657,633. The term "water conducting components" as used herein generally refers to spool 11 and drop pipe 11a. The pump discharges water up the drop pipe 11a into the water pressure chamber 14 through valve 14a, and thence out the outlet 13 to the pressure tank (not shown). The pressure in the pressure tank may be determined from the water pressure in water pressure chamber 14.

Reducer bushing 15 is secured to threaded outlet 16 which extends from water chamber 14. Coiled tubing 17 is connected to reducer bushing 15 by male connector 18 and compression nut 19. The other end of the tubing 17 is secured to pipe 20 by male connector 21 and compression nut 22. Pipe 20 passes through a hole 23 in the lower end 24 of mounting panel 25 and is positioned therein by jam nuts 26 and 27. A conventional pressure switch 28 is connected to pipe 20.

Motor control box 29 is secured to mounting panel 25 by nuts 30 and 31. Chain 32 is secured to mounting panel 25 by nut 33 and bolt 34 or other appropriate means. Hook 35 is secured to the opposed end of chain 32 which retains mounting panel 25 and its attachments in position within casing 37, by hooking over cap mounting collar 36. Mounting collar 36 is threadedly engaged over casing 37 which is likewise threadedly secured at its lower end to well unit 10. Casing 37 usually extends above the surface of the soil 38, and may be enlarged sufficiently to accommodate any required size of pressure switch and control box.

Mounting collar 36 has an aperture 39 through which electric wire 40 from pressure switch 28 may extend through conduit 41, to an electric disconnect switch box 54. Seal cap 42 which is vented through pipe 45, fits over gasket 43 and is secured to mounting collar 36 by bolts 44. Electric wires 46 lead from pressure switch 28 to control box 29, and electric wires 47 extend from control box 29 to the pump motor 52 down in the well. Where the control box is not used the wires 46 extend directly from the pressure switch 28 to the pump motor 52, with sufficient length to permit removal of mounting panel 25 from casing 37.

Mounting panel 25 has apertures 48 and apertured cross-bars 49 and 50 to permit necessary adjustment for various-sized control boxes. The lower end 24 of mounting panel 25 is set at an angle from the back thereof to provide better access to pressure switch 28 and avoid short bending of tubing 17. Upper end 51 of mounting panel may also be slanted to cause the control box and pressure switch to hang straight during insertion and removal. Electric wires 47 are provided with extra length as shown in FIG. 1 to permit the raising of the mounting panel 25, control box 29 and pressure switch 28 above the upper edge of casing 37.

In climates having freezing temperatures pressure switch 28 is placed below the freezing line within the casing 37 (indicated by dotted line F) to prevent freezing. It is to be understood that the length of coiled tubing 17, chain 32, wires 47 and casing 37 may be varied to suit any particular requirements.

During normal operations the device is used as shown in FIG. 1. The water pressure in the water pressure tank (not shown) is reflected in water pressure chamber 14 and conveyed through coiled tubing 17 to pressure switch 28. The coiled tubing 17 also aids in isolating

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sudden water pressure changes, caused by starting and stopping of the pump 53, from the pressure switch, thus avoiding undesirable opening and closing of the pressure switch that might occur from a more direct connection between the water pressure chamber and the pressure switch. It is also desirable to use an orifice in the fluid connection to the pressure switch as is well known in the art, to further isolate the pressure switch.

When the pressure in the water pressure tank reaches a predetermined low level, the pressure switch 28 is activated and it in turn activates the control box 29 through wire 46. The control box 29 then activates the pump motor 52 through wires 47, which causes water to be pumped into the water pressure tank through outlet 13. When the pressure in the water pressure tank reaches a predetermined point, it will likewise be relayed to pressure switch 28 through pressure chamber 14, and coiled tubing 17, and, in turn, will deactivate control box 29 and cause the pump motor 52 to cease pumping water into the water pressure tank.

If the control box 29 or pressure switch 28 require adjustment or repair, the seal cap 42 may be easily removed by loosening and removing bolts 44. Hook 35 is unhooked from cap mounting collar 36 and the chain 32 is pulled upward so that control box 29 and pressure switch 28 on mounting panel 25 are brought above the upper edge of cap mounting collar 36. As the mounting panel 25 and attachments are moved upward the coiled tubing uncoils and thus remains connected to pressure switch 28 and water pressure chamber 14. There is no need to remove the pump 53, drop pipe 11a or spool 11 while adjustments or repairs are made to the control box or pressure switch. Moreover, if desired, the system may be in operation while the control box and pressure switch are thus removed from the casing 37. When the adjustments or repairs have been made, the mounting panel 25, with the control box 29 and pressure switch 28, are again lowered within the casing 37 and hook 35 again rehooked over the upper mounting collar 36, and seal cap 42 again secured in place over gasket 43 with bolts 44.

While a preferred embodiment of my invention has been described and illustrated herein, it is to be understood that various modifications may be made without departing from the spirit and intended scope of the invention as set forth in the appended claims. It is further to be understood that the invention is applicable to the pumping of fluids, and the application is not to be construed as limited to use in the pumping of water. As stated, the invention may be used without a motor control box, where a pressure switch only is used. Where the term "junction box assembly" is used it is to be understood that the casing in which the assembly is used may constitute the walls or sides of the junction box.

I claim:

1. A device for control of fluid pressure within a chamber for use within an upward extending casing comprising, a mounting panel within said casing, a fluid pressure switch and a motor control box secured to said mounting panel, said mounting panel being adjustable to permit attachment of motor control boxes of varying sizes, coiled tubing having one end thereof in communication with said chamber and the other end in communication with

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said fluid pressure switch, means for removing said mounting panel and the attached pressure switch and control box from said casing while retaining communication between said chamber and said pressure switch without changing the position of said chamber.

2. A device for control of fluid pressure within a chamber for use within an upward extending casing having an upper edge comprising, a mounting panel within said casing, a fluid pressure switch secured to said mounting panel, coiled tubing having one end thereof in communication with said chamber and the other end in communication with said fluid pressure switch, means secured to said mounting panel and in communication with the upper edge of said casing for vertically suspending said mounting panel and its attachments within said casing, and means for removing the same from said casing while retaining communication with said chamber and without changing the position of said chamber.

3. A junction box assembly for connection in a casing of fluid pressure controls with an electric motor and power connections comprising, a mounting panel, a fluid pressure switch and a motor control box secured to said mounting panel, extendable coiled tubing in communication with said fluid pressure switch and said fluid, electrical conducting means extending from said fluid pressure switch to said motor control box and said power connection, electrical conducting means extending from the motor control box to said motor, means for removing said mounting panel and its attachments from the casing by extending said coiled tubing while retaining communication with the fluid.

4. A junction box assembly for connection in a casing of fluid pressure controls with electric motor and power connections comprising, an adjustable mounting panel having a central body and offset ends, means for securing a motor control box to the central body, means for securing a fluid pressure switch to one end of the mounting panel, extendable coiled tubing connected at one end to said fluid pressure switch and connected at the other end with the fluid to be controlled, electrical conducting means extending from said fluid pressure switch to said motor control box and said power connections, electrical conducting means between said motor control box and said motor, means secured to the other end of said mounting panel for retaining the same in vertically suspended position within said casing, and means for removing said mounting panel from said casing by extending said coiled tubing while retaining communication with the fluid.

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