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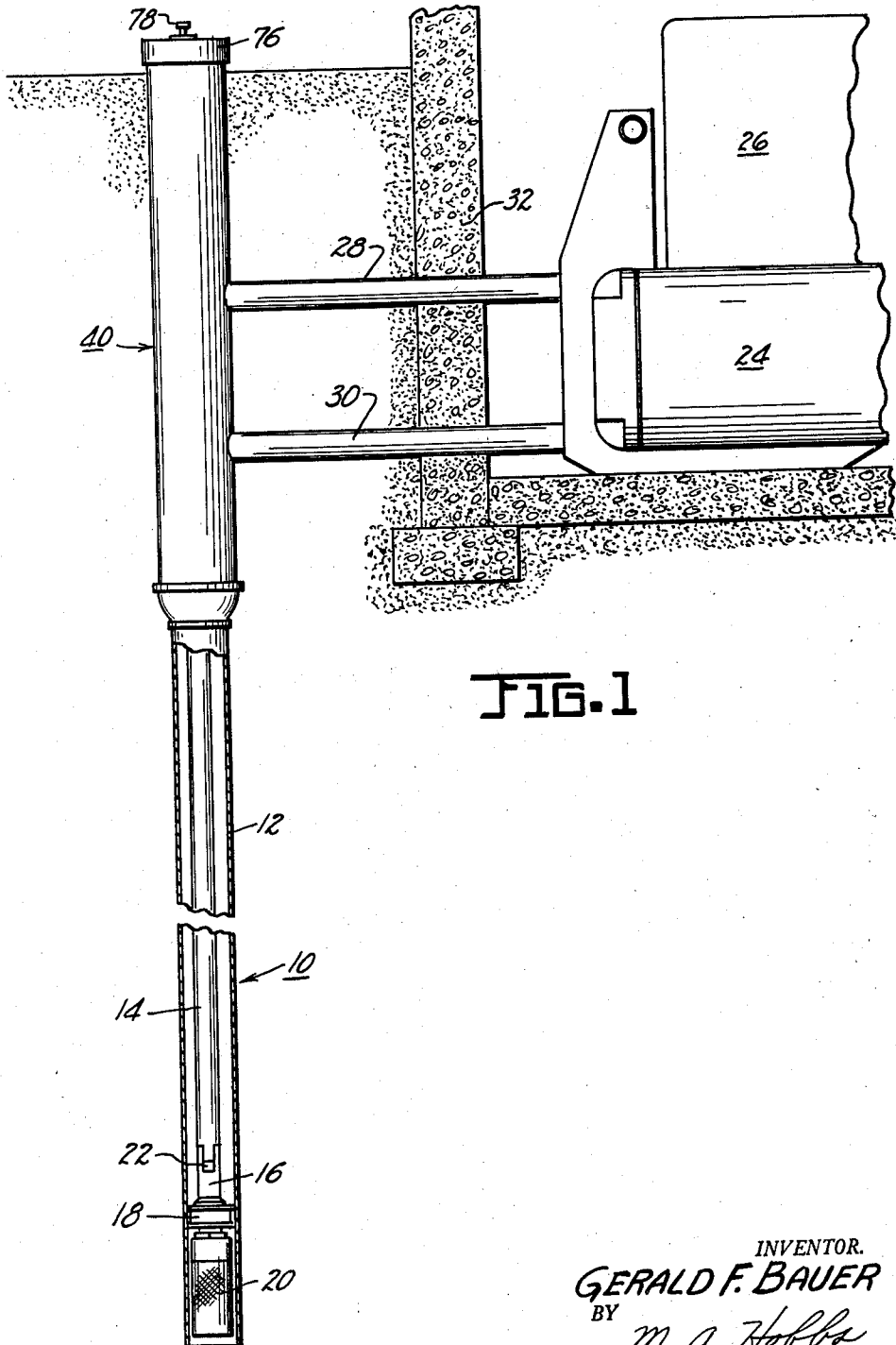
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2,859,823

WELL ADAPTER

Filed March 8, 1956

2 Sheets-Sheet 1



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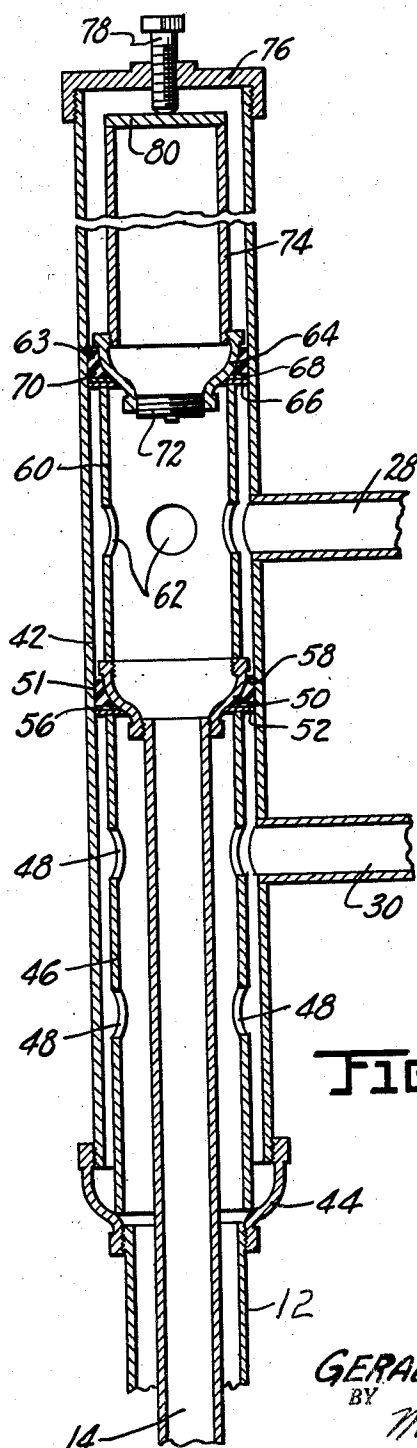
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WELL ADAPTER

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13 Claims. (Cl. 166—88)

The present invention relates to a well pumping system and more particularly to a well adapter of the underground pitless type.

One of the principal objects of the present invention is to provide a well adapter of the pitless type which is disposed completely underground and which can readily be installed in the casing of the well and thereafter easily serviced without disconnecting the pipes to the pump.

One of the problems encountered in pitless adapters for wells having a pressure pipe and a suction pipe is maintaining an effective seal between the pressure and suction systems in the adapter, particularly in systems where the casing is used in the well as the pressure conduit. When an effective seal is not maintained between the pressure and suction systems the efficiency of the pump is decreased and in some instances the pump becomes completely inoperable. In most of the well adapters on the market the seal is difficult to maintain and to repair if it becomes defective. It is therefore one of the primary objects of the invention to provide a well adapter in which an effective seal can be maintained between the pressure and suction systems and, in the event the seal becomes defective, which can readily be adjusted to make it effective without disassembling the adapter or removing any part thereof from the well.

Another object of the invention is to provide a well adapter which can be readily installed in place on the casing of the well and thereafter disassembled for servicing and repair.

Another object of the invention is to provide a well adapter which is easily accessible from above the ground and which can be serviced and repaired through a small opening at or near the surface of the ground.

Still another object of the invention is to provide a relatively simple well adapter which is so constructed and arranged that the natural forces and stresses encountered tend to increase the effectiveness of the seal between the pressure and suction systems, thus giving a long trouble-free operating performance.

A further object is to provide an efficient and easy to maintain well pumping system wherein the pump and storage tank are placed in the basement or utility room of a home and the well is located away from the structure and in which all the connections between the pump and well are disposed underground and concealed from view.

Further objects and advantages will become apparent from the following description and accompanying drawings, wherein:

Figure 1 is a partial cross sectional and elevational view of a well and pumping system in which an adapter embodying the present invention is installed; and

Figure 2 is a vertical cross sectional view through the well adapter embodying my invention.

Referring more specifically to the drawings and to Figure 1 in particular, numeral 10 designates a well having a casing 12 in which is disposed a pressure-suction type

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system consisting of a suction pipe 14, injector 16, packer 18 and foot valve 20. Water under pressure from the pump is forced downwardly in the casing around suction pipe 14 and through port 22 into injector 16. A pump 24 and a water storage tank 26 are shown disposed in the basement of a home or in a utility room and the pump is connected with the well casing by a suction pipe 28 and a pressure pipe 30, both pipes passing from the pump through the building foundation 32 and passing underground to my well adapter 40. The pump is preferably driven by an electrical motor enclosed in the pump housing and is controlled automatically in response to the demand on the system. The pump, tank and pressure-suction type system in the well casing may be considered, for the purpose of the description of the present invention, as standard and conventional pumping equipment and represent one of a number of different types which can be successfully used with my adapter. Furthermore, my adapter can be used equally as well with the two pipe injector type system, by making only slight modifications in the structure disclosed herein.

Adapter 40 is enclosed in a vertical casing 42 secured to the upper end of well casing 12 and is adapted to separate and effectively seal the pressure system from the suction system and the suction system from the top of casing 42, the latter seal being for the purpose of preventing contaminating ground and surface water from finding its way into the suction system and then into the main water supply system. Casing 42 is connected to casing 12 by a reducer coupling 44 threaded onto the upper end of the well casing and the lower end of the adapter casing. A sleeve 46 having a plurality of large holes 48 seats or rests on the internal surface of coupling 44 and supports on its upper end a second reducer coupling 50 which in turn is threaded onto the upper end of suction pipe 14 and supports the entire weight of said pipe, the injector and the foot valve attached to the lower end of pipe 14. The weight carried by reducer coupling 50 assists in the formation of an effective seal between the pressure and suction systems. Interposed between the upper end of sleeve 46 and coupling 50 is a seal 51 consisting of a gasket 52 contacting the upper end of sleeve 46, a metal washer or ring 56 over gasket 52 and a thick, relatively massive gasket 58 engaging the upper surface of washer 56, the external surface of coupling 50 and the internal surface of casing 42. Gasket 58 is preferably constructed of rubber or rubber like material which has considerable resiliency and deformability while gasket 52 is preferably constructed of rather firm material such as leather. The weight of pipe 14 urging coupling 50 downwardly causes the tapered side walls of the coupling to force gasket 58 downwardly and outwardly firmly against the top of washer 56 and the side walls of casing 42. This downward force also forces the gasket firmly against the external surface of coupling 50. The downward pressure created by the weight of pipe 14 is constant throughout the life of the installation and applies the necessary pressure to form an effective seal between gasket 58 and the respective surfaces on coupling 50, washer 56 and casing 42.

Mounted on top of coupling 50 and in alignment therewith is a second sleeve 60 having a plurality of relatively large holes 62 connecting the annular space between said sleeve and the casing with the interior of the sleeve, thus providing communication between suction pipe 14 and suction pipe 28. The seal 63 between the suction system and the top of casing 42 is similar in construction to the seal between the pressure and suction systems, consisting of a reducer coupling 64, a gasket 66 on the upper end of sleeve 60, a metal washer 68 over gasket 66 and a

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thick, relatively massive gasket 70, engaging the upper surface of washer 68, the external surface of coupling 64 and the internal surface of casing 42. Coupling 64 is sealed by a plug 72 threadedly received in the small opening of the coupling. To provide the pressure necessary to form an effective seal between gasket 70 and the surfaces in contact therewith, a pipe 74 is interposed between the upper end of coupling 64 and a cap 76 threaded onto the upper end of casing 42. In order to increase or otherwise vary the pressure applied by coupling 64 on gasket 70, an adjustment screw or bolt 78 is threaded through a hole in the center of cap 76 and engages a rigid plate 80 disposed across the upper end of pipe 74. By screwing the screw downwardly the pressure applied by the coupling on gasket 70 will be increased. Pipe 74 is preferably threaded into or otherwise secured to coupling 64 so that in disassembling the adapter coupling 64 can easily be removed when pipe 74 is lifted from the casing.

In installing the present adapter casing 42 is secured to well casing 12 by coupling 44, then sleeve 46 is lowered or dropped into place on coupling 44, seal 51 is assembled on the upper end of said sleeve and suction pipe with coupling 50 secured thereto is lowered into place. To assist in lowering and adjusting the position of suction pipe 14 a pipe of sufficient length to extend out the top of adapter casing 42 may be threaded into the large end of coupling 50. This extension pipe can be used to lower pipe 14 gradually into the well casing and can be used to reciprocate pipe 14 up and down in initially priming the pump. After the extension pipe has been attached to coupling 50, sleeve 60 can be slipped over the pipe and lowered into place along with suction pipe 14. After the foregoing parts have been assembled in place and the extension pipe disengaged from coupling 68 and removed from the adapter casing, coupling 64 threaded onto the end of pipe 74 is lowered into place internally of seal 63, and then cap 76 is threaded onto and tightened to the upper end of casing 42. When the adapter has been assembled, screw 78 is tightened sufficiently to assure the formation of a water tight seal by gaskets 58 and 70.

In disassembling the adapter, cap 76 is removed and pipe 74 and seal 63 are lifted from the adapter casing 42. The extension pipe is then screwed into the large end of coupling 50 and pulled upwardly, lifting suction pipe 14 and sleeve 60 from the casing. Sleeve 46 and seal 51 can thereafter easily be lifted from the casing by using a rod having a short lateral extension on its lower end for hooking into one of holes 48. When the adapter has been disassembled the inside walls of the casing and the various parts can be efficiently and thoroughly cleaned and reconditioned for further use.

Various changes can be made in the foregoing adapter structure without departing from the present invention. For example, an effective seal can be formed at cap 76 as a substitute for seal 63 and sleeve 60, coupling 64 and pipe 74 can be dispensed with or replaced by a perforated pipe consisting of an extension of pipe 74 adapted to seat on the upper end of coupling 50. As used in the claims the term "tapered member" refers to couplings 50 and 64 and is intended to include any suitable substitute for said couplings.

I claim:

1. An adapter for a well having a vertically disposed suction pipe therein, comprising a tubular casing, a lower end member joined to said casing and having a hole longitudinally therethrough, means defining an opening in the side wall of the casing for a suction pipe, means defining an opening in the side wall of the casing for a pressure pipe disposed between said first opening and said end member, a perforated sleeve resting on said member and extending to a point between said openings, an annular seal in said casing between said openings supported by said sleeve, a tapered member having a passage therethrough and adapted to seat on said seal and to support the vertical suction pipe in the well, a perforated sleeve

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resting on the upper end of said tapered member, a seal in said casing between said suction opening and the upper end of said casing supported by said last mentioned sleeve, a tapered member adapted to seat on said last mentioned seal, a cap for said casing, a member interposed between said cap and said last mentioned tapered member for urging said tapered member against said last mentioned seal, and a screw in said cap for varying the pressure applied by said interposed member on said tapered member.

2. An adapter for a well having a vertically disposed suction pipe therein, comprising a tubular casing, a lower end member joined to said casing and having a hole longitudinally therethrough, means defining an opening in the side wall of the casing for a suction pipe, means defining an opening in the side wall of the casing for a pressure pipe disposed between said first opening and said end member, a perforated sleeve resting on said member and extending to a point between said openings, an annular seal in said casing between said openings supported by said sleeve, a tapered member having a passage therethrough and adapted to seat on said seal and to support the vertical suction pipe in the well, a perforated sleeve resting on the upper end of said tapered member, a seal in said casing between said suction opening and the upper end of said casing supported by said last mentioned sleeve, a tapered member adapted to seat on said last mentioned seal, a cap for said casing, and a member interposed between said cap and said last mentioned tapered member for urging said tapered member against said last mentioned seal.

3. An adapter for a well having a vertical suction pipe therein, comprising a casing having a reduced lower end portion, means defining an opening in the side wall of the casing for a suction pipe, means defining an opening in the side wall of the casing for a pressure pipe disposed between said first opening and said end portion, a perforated sleeve resting on said end portion and extending to a point between said openings, an annular seal in said casing between said openings in contact with the end of said sleeve, a tapered member having a passage therethrough and adapted to seat on said seal and to support the vertical suction pipe in the well, a perforated sleeve resting on the upper end of said tapered member, a seal in said casing between said suction opening and the upper end of said casing, a tapered member adapted to seat on said last mentioned seal, a cap for said casing, a member interposed between said cap and said last mentioned tapered member for urging said tapered member against said last mentioned seal, and a means for varying the pressure applied by said interposed member on said tapered member.

4. An adapter for a well having a vertical suction pipe therein, comprising a casing having a reduced lower end portion, means defining an opening in the side wall of the casing for a suction pipe, means defining an opening in the side wall of the casing for a pressure pipe disposed between said first opening and said end portion, a perforated sleeve resting on said end portion and extending to a point between said openings, an annular seal between said openings in contact with the end of said sleeve, a tapered member having a passage therethrough and adapted to seat on said seal and to support the vertical suction pipe in the well, a perforated sleeve resting on the upper end of said tapered member, a seal in said casing between said suction opening and the upper end of said casing, a tapered member adapted to seat on said last mentioned seal, a cap for said casing, and a member interposed between said cap and said last mentioned tapered member for urging said tapered member against said last mentioned seal.

5. An adapter for a well having a vertical suction pipe therein, comprising a casing having a reduced lower end portion, means defining an opening in the side wall of

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the casing for a suction pipe, means defining an opening in the side wall of the casing for a pressure pipe disposed between said first opening and said end portion, a perforated sleeve resting on said end portion and extending to a point between said openings, an annular seal between said openings in contact with the end of said sleeve, a tapered member having a passage therethrough and adapted to seat on said seal and to support the vertical suction pipe in the well, a perforated sleeve resting on the upper end of said tapered member, a seal in said casing between said suction opening and the upper end of said casing, a tapered member adapted to seat in said last mentioned seal, and means for applying pressure to said last mentioned tapered member.

6. An adapter for a well having a vertical suction pipe therein, comprising a casing having a reduced lower end portion, means defining an opening in the side wall of the casing for a suction pipe, means defining an opening in the side wall of the casing for a pressure pipe disposed between said first opening and said end portion, a perforated sleeve resting on said end portion and extending to a point between said openings in contact with the end of said sleeve, an annular seal between said openings, a tapered member with a passage therethrough supported by said sleeve and adapted to support the vertical suction pipe in the well, a perforated sleeve resting on the upper end of said tapered member, an annular seal in said casing between said suction opening and the upper end of said casing, and a tapered member adapted to seat in said seal.

7. An adapter for a well having a vertical suction pipe therein, comprising a casing having a reduced lower end portion, means defining an opening in the side wall of the casing for a suction pipe, means defining an opening in the side wall of the casing for a pressure pipe disposed between said first opening and said end portion, a perforated sleeve resting on said end portion and extending to a point between said openings, an annular seal between said openings, a tapered member having a central passage therethrough and adapted to seat on said seal and to support the vertical suction pipe in the well, a perforated sleeve resting on the upper end of said tapered member, an annular seal in said casing between said suction opening and the upper end of said casing, and a tapered member adapted to seat in said last mentioned seal.

8. An adapter for a well having a vertical suction pipe therein, comprising a casing having a reduced lower end portion, means defining an opening in the side wall of the casing for a suction pipe, means defining an opening in the side wall of the casing for a pressure pipe disposed between said first opening and said end portion, a perforated sleeve resting on said end portion and extending to a point between said openings, an annular seal between said openings supported by said sleeve, a tapered member having a passage therethrough and adapted to seat on said seal and to support the vertical suction pipe in the well, a cap for said casing, and a means interposed between said cap and said tapered member for urging said tapered member against said seal.

9. An adapter for a well having a vertical suction pipe therein, comprising a casing having a reduced lower end portion, means defining an opening in the side wall of the casing for a suction pipe, means defining an opening in the side wall of the casing for a pressure pipe disposed between said first opening and said end portion, a perforated sleeve resting on said end portion and extending

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to a point between said openings, an annular seal between said openings in contact with the end of said sleeve, a tapered member having a passage therethrough and adapted to seat on said seal and to support the vertical suction pipe in the well, a cap for said casing, and a means interposed between said cap and said tapered member for urging said tapered member against said seal.

10. An adapter for a well having a vertical suction pipe therein, comprising a casing having a reduced lower end portion, means defining an opening in the side wall of the casing for a suction pipe, means defining an opening in the side wall of the casing for a pressure pipe disposed between said first opening and said end portion, a perforated sleeve resting on said end portion and extending to a point between said openings, an annular seal between said openings closing the space between the upper end of said sleeve and the internal side wall of said casing, a tapered member having a passage therethrough and adapted to seat on said seal and to support the vertical suction pipe in the well, and a cap for said casing.

11. An adapter for a well having a vertical suction pipe therein, comprising a casing having a reduced lower end portion, means defining an opening in the side wall of the casing for a suction pipe, means defining an opening in the side wall of the casing for a pressure pipe disposed between said first opening and said end portion, a perforated sleeve resting on said end portion and extending to a point between said openings, an annular seal between said openings supported by said sleeve, and a tapered member having a passage therethrough and adapted to seat on said seal and to support the vertical suction pipe in the well.

12. An adapter for a well having a vertical suction pipe therein, comprising a casing having a reduced lower end portion, means defining an opening in the side wall of the casing for a suction pipe, means defining an opening in the side wall of the casing for a pressure pipe disposed between said first opening and said end portion, a perforated sleeve extending from the lower end of said casing to a point between said openings and being supported by said lower end, an annular seal between said openings in contact with the end of said sleeve, and a tapered member having a central passage therethrough and adapted to seat on said seal and to support the vertical suction pipe in the well.

13. An adapter for a well having a vertically disposed suction pipe therein, comprising a casing having a lower end portion, means defining an opening in the side wall of the casing for a suction pipe, means defining an opening in the side wall of the casing for a pressure pipe disposed between said first opening and said end portion, a perforated sleeve extending from the lower end of said casing to a point between said openings and being supported by said lower end, an annular seal between said openings, and a tapered member between said openings with a passage therethrough supported by said sleeve and adapted to support the vertical suction pipe in the well.

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