Jan. 30, 1962 H. W. MAASS 3,018,829

PITLESS WELL ADAPTORS

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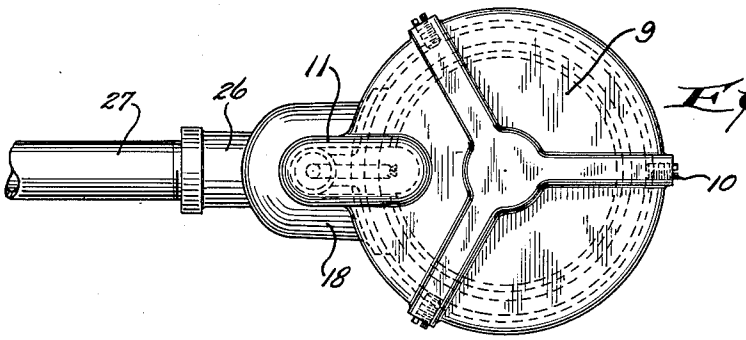



Fig. 2.

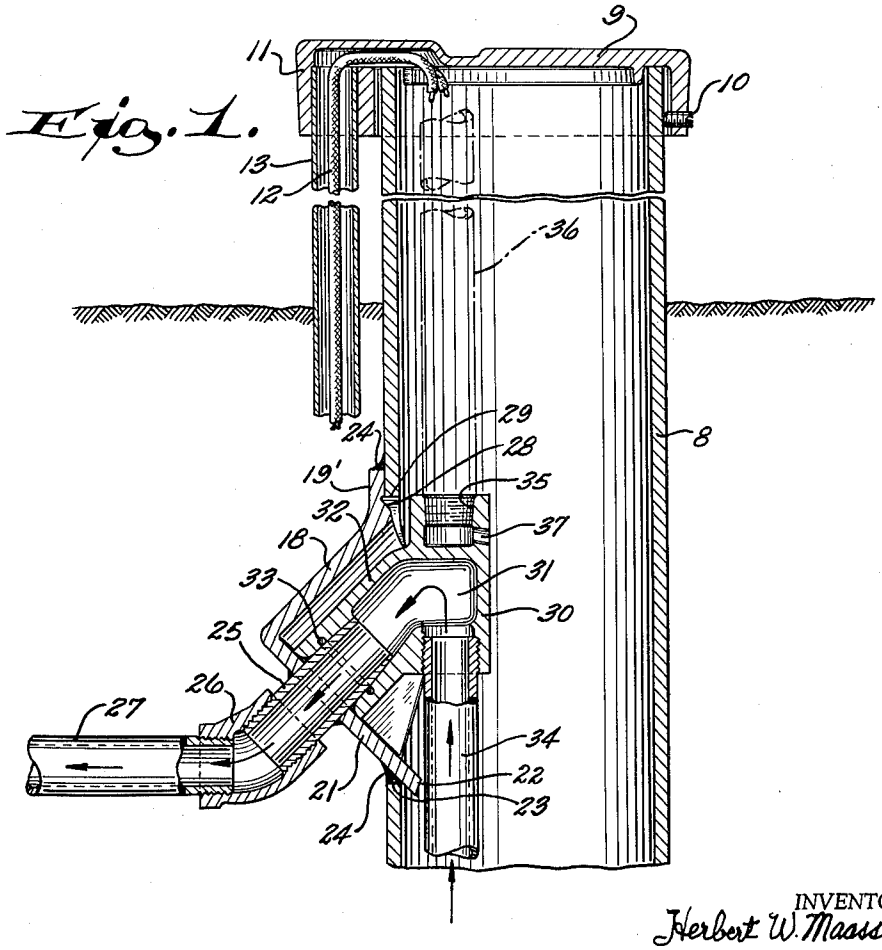



Fig. 1.

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Fig. 3.

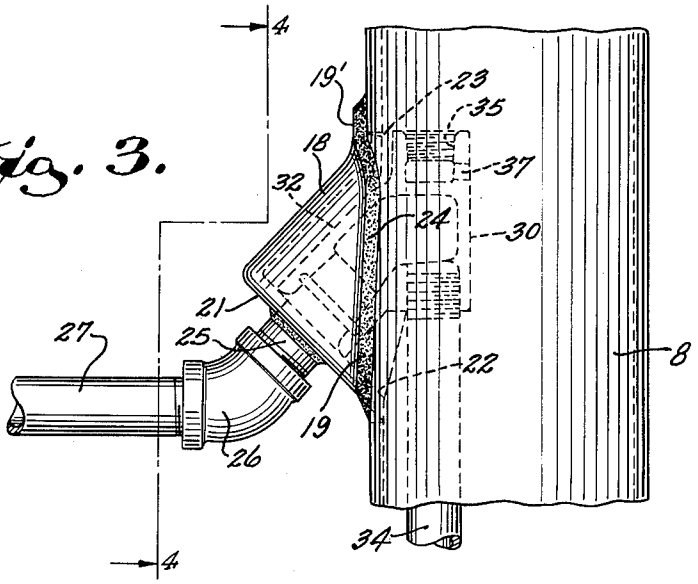



Fig. 4.

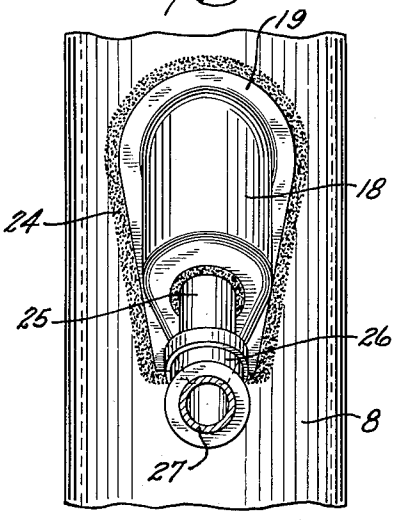
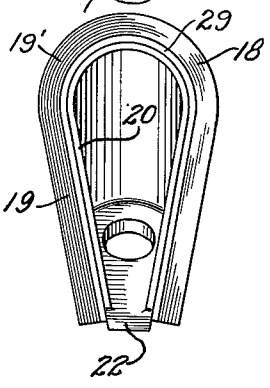



Fig. 5.




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# PITLESS WELL ADAPTORS

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This invention relates to improvements in pitless well adaptors.

Well installations of the so-called "pitless" type, including a submersible pump, must, according to various state codes, provide for the well casing being sealed against the entrance of foreign matter and drainage, but it is essential that the construction permit the removal and inspection of the submersible pump and its motor from time to time.

The Herbert W. Maass et al. prior Patent No. 2,841,223 has as its general objective the provision of a pitless well adaptor for submersible pump wells in which the pump and its appurtenances can be conveniently and quickly removed for repairs and inspection, the construction of said prior patent also providing a well casing below the frost line in the ground with a laterally extending sealed box of triangular contour forming a part of but offset from the well casing and communicating with the interior thereof in a manner so as to seal the well casing against the entrance of foreign matter and drainage water.

The pitless well adaptor of the present invention is an improvement over that of United States Patent No. 2,841,223, and the box, forming a part of the well casing, is substantially horseshoe in shape and is mounted in an opening provided therefor in the well casing, the shape of the box and the corresponding shape of the opening therefor in the well casing rendering it impossible for the welder or installer to mount the box incorrectly in the casing opening and insuring the projection of a marginal portion of the box through the opening into the well casing, thus facilitating the connection of internal fitting portions with a housing nipple.

A further object of the invention is to provide, in a pitless well adaptor, a laterally extending horseshoe shaped box which, during installation, may be lowered against the outer wall portion of the well casing and accurately registered with a curved opening provided therefor in the casing wall, leaving an annular, accessible, protruding ledge or sill which facilitates the welding of the horseshoe shaped box to the casing.

A further object of the invention is to provide, in a pitless well adaptor, a horseshoe shaped box which is so shaped that the welder or installer can see the peripheral portions thereof which are to be welded onto the casing and respecting which there are no bottom blind spots, the shape of the box minimizing the extent of welding required.

A further object of the invention is to provide, in a pitless well installation, an adaptor including a horseshoe shaped box communicating with the interior of the well casing and sealed thereto, which box and associated portion of the well casing will meet all sanitary requirements in the elimination of pockets or crevices which might collect foreign matter and condensation to prevent contamination of the water in the well or that passing through the flow or supply pipes.

A further object of the invention is to provide a pitless well adaptor which is easy to remove from the pump casing because the box is devoid of abrupt edges or shoulders which might contact the casing when the installation is being raised for removal and inspection.

A further object of the invention is to provide, in a pitless well adaptor of the class described, an easily applied box of horseshoe contour which has steeply inclined walls to afford effective drainage of water of condensation into the well casing and away from the pipe connections, the lower edge or lip of the box projecting into the casing at an inclination and preventing condensation or water from collecting on the inner wall of the casing.



A further object of the invention is to provide a pitless well adaptor which is of very simple construction, which meets all sanitary and code requirements, which is extremely easy to install and service, which is efficient in operation, and which is well adapted for the purposes described.

With the above and other objects in view, the invention consists of the improved well adaptor, and its parts and combinations as set forth in the claims, and all equivalents thereof.

In the accompanying drawings in which the same reference characters indicate the same parts in all of the views:

FIG. 1 is a vertical sectional view through the upper portion of a well installation of the pitless submersible pump type embodying the improved adaptor;

FIG. 2 is a plan view of the showing in FIG. 1;

FIG. 3 is a fragmentary side view of that portion of the well casing which includes the sealed horseshoe-shaped box and the water supply pipe leading from the well casing;

FIG. 4 is a fragmentary sectional view taken approximately along the line 4—4 of FIG. 3; and

FIG. 5 is a view of the inner face portion of the horseshoe-shaped box forming part of the assemblage.

Referring now more particularly to the drawings and to FIG. 1 thereof, it will appear that the well casing, of circular form in cross section, is indicated generally by the numeral **8** and protrudes above the ground level a required distance. The upper end of the casing **8** has applied thereto a suitable flanged sealing cap **9** which may be secured in closing relation by a set screw **10**. A portion of the sealing cap **9** has a slightly upwardly offset and then downturned hollow extension **11** which accommodates the electrical cable **12** surrounded by a protective tube **13**. There may be used with the well a conventional pump and motor of the type found on the open market, and which have not been illustrated, but the motor receives electricity from the cable **12**.

A particular feature of the invention and which is an improvement over the equivalent member shown in Patent No. 2,841,223, resides in the provision of a box **18** which in its overall contour is substantially of horseshoe or oval shape as is best seen from FIGS. 4 and 5. Said box **18** has a peripheral well casing wall engaging ledge or lip **19**, slightly outwardly offset at its upper end from the plane of the major portion of the lip, as at **19'** in FIGS. 1 and 3. The inner margin of the lip **19—19'** of the box carries an integral rib **20** whose plane is at right angles to the plane of the lip. The hollow body portion of the box **18** is in the form of an angular section of a cylinder with the bottom wall **21** of the box being at right angles to the axis of its body portion. The central lower margin of the bottom wall **21** of the box, between the terminal portions of the lip **19**, is formed with a protruding tongue **22** (see FIGS. 3 and 5).

The well casing **8**, below the frost level, is provided with a horseshoe-shaped opening **23** to which the box **18** is applied in the manner shown in the drawings to close the opening in the well casing wall and to project outwardly laterally therefrom. To seal the horseshoe-shaped box **18** to the well casing and to close the well casing wall opening **23**, the downwardly directed tongue **22** on the box **18** is inserted into the correspondingly shaped, tapered lower end portion of the well casing opening **23** and the tongue **22** will engage the stock or sill surrounding the portion of the opening but will form

a flush continuation of the inner surface of the well casing, as is best shown in FIGS. 1 and 3. The ledge portion **19** of the box **18** will engage the outer surface of the well casing immediately surrounding the opening **23**, but the rib **20** will project slightly into the opening adjacent the stock surrounding the opening and thus locate the box in proper position and prevent dislocation thereof. The offset top portion **19'** of the ledge **19** permits said portion to rest on the outer surface of the casing whereas the lower tongue **22** actually enters the casing wall opening **23**. As is best shown in FIG. 1, the inner face of the offset portion **19'** of the ledge has an upwardly, outwardly inclined portion **28** terminating in a groove **29**. As will appear from FIG. 5 said groove **29** is adjacent to and surrounds the horseshoe-shaped rib **20** and terminates at the lower extremities of the ledge **19**. This requires the installer to cut a sufficiently large opening **23** in the casing wall to receive the box rib **20**. The surrounding groove **29** will accommodate any burr which may be left on the casing from the torch cutting and burning operation to form the opening **23**. When the box is positioned, as described, the welder making an installation will then weld the lip margin **19** of the box **18** to the outer face of the well casing surrounding the opening **23**, as indicated at **24** in the drawing. All edges which are to be welded together are readily accessible and visible and the welder can perform the welding operations with facility and full access to all of the surfaces including the bottom. The step inclination of the bottom wall **21** of the box also aids access to the surfaces to be welded together and the overall shape of the unit is such that less welding is required than in respect to other pitless well adaptor boxes.

Projecting into the lower inclined bottom wall **21** of the box **18** and welded thereto, is a stainless steel nipple **25** whose threaded outer end portion is threaded into one end portion of a 45° elbow **26** which also has threaded thereinto the inner end portion of a horizontally directed water supply pipe **27**.

The numeral **30** designates a bronze casting in the form of a fitting having a downwardly directed oblique lateral extension. The main portion of the fitting **30** has a chamber **31** therein in communication with the hollow portion of a downwardly inclined oblique lateral extension **32**, which, in the installation, projects into the hollow interior of the horseshoe-shaped box **18** to receive and connect with the inner tapered end portion of the nipple **25** which has a force fit within the bore of the fitting extension **32**, fluid leakage being prevented by an O-ring **33**. The lower portion of the bronze fitting **30** has a vertically directed internally threaded opening therein communicating with the fitting chamber **31** and into which is threaded the upper end portion of a flow pipe **34** which extends downwardly into the lower portion of the well casing to have water forced upwardly therein when the well pump is in operation. It will be obvious that the flow of water will be as indicated by the arrows in FIG. 1, the water passing from the upper end of the flow pipe **34** through the bronze fitting cavity **31**, into and through the nipple **25** and below **26**, and then through the supply pipe **27** to wherever the water is to be utilized. This entire passageway is devoid of obstructions of any character.

The upper end portion of the bronze fitting **30** is provided with an internally threaded socket **35** into which the lower end portion of a drop pipe **36** (see FIG. 1) may be threaded when the installation is being made or when parts are to be removed from the well casing for repairs and inspection. The drop pipe **32** is, of course, only temporarily applied when the top cap **9** of the well casing is removed or opened. The installation, when it is disconnected from the nipple **25** may be moved vertically through the well casing **8** by the means described, and there are no ledges nor protruding portions which will catch or snag against the inner wall portions of the well casing. For servicing the well adaptor and other parts, no digging around the well casing is required.

When the parts are assemled as in FIGS. 1 and 3, it will be obvious that the assemblage is devoid of internal horizontal walls and ledges such as might collect and retain condensation and foreign matter. The steeply inclined walls of the box **18**, which is offset from the casing proper, and which houses the nose portion of the bronze fitting **30** and nipple, facilitate the flow of water of condensation and foreign matter into the interior of the well casing **8** so that condensation and foreign matter will not collect around the fitting joints. The bottom wall **21** of the box eliminates pockets and provides the tongue **22** projected at a steep inclination into the well casing to cause undesired foreign matter to flow or gravitate into the well casing and not pocket or collect in the area of the box and fittings.

From FIG. 1 it will be seen that the inner surface of the end of the tongue **22**, after being welded in place contacts the sill of the casing opening and forms a flush continuation of the inner surface of the casing wall thereadjacent. The upper end portion of the bronze casting **30** is formed with a downwardly outwardly inclined auxiliary port **37** which allows drainage of condensation or foreign matter which might collect in the socket **35** in the upper end of the member **30**.

An outwardly projecting box on a wall portion of a well casing to house a portion of the detachable connections is important in the event that the flow pipe and connections are required to be removed from the casing in the manner previously described for redrilling or for servicing of the well. In this event, the fitting **30** is pulled vertically out of the well casing and is detached from the nipple **25** with which it has a force fit. As nothing then will remain within the full cross-sectional area of the well casing proper, it is unobstructed for the use of a drill or other tools.

Besides providing pocketless inclined surfaces to eliminate the collection of condensation and foreign material, the adaptor, and horseshoe-shaped box **18** are of a construction which greatly facilitate and simplify the installation. As was previously described, the well casing opening **23** must be made sufficiently large to adequately receive the ribbed portion **20** of the box, plus the inclined surface **28** of the box lip offset **19'**. With the lip **19**, the rib **20**, and tongue **22**, it is impossible to err in the location of the box prior to the welding operation and the contour of the box and its lip **19** is such that the welding operation may be carried out with vision and access to the the surfaces and a relatively small extent of welding is required. By insuring the correct and positive location of the box on the well casing, the nose portion **32** of the fitting **30** is sure to be properly alined with the nipple **25**.

The improved pitless well adaptor is of simple and novel construction, and is well adapted for the purposes described.

What is claimed as the invention is:

1. In a well casing having an underground hollow section with an opening in its wall, an edge of which forms a sill, a laterally extending box of ovate contour rigidly secured to the casing section in registration with said opening with the lowermost wall of the box forming an acute angle to the axis of the casing section and having a peripheral laterally extending ledge with an inwardly spaced rib terminating at the lower end of the box in a downwardly inwardly inclined tongue extending beyond the ledge and rib and being interposed between the ends of the same, said tongue and said rib extending into said casing section opening with the tongue engaging said sill, a flow pipe within said casing section, a chambered, oblique lateral fitting having its main portion connected to and in communication with the flow pipe, a nipple rigidly mounted in the lower wall of said box and connected at its inner end to a portion of the fitting, and a

supply pipe connected to the outer end portion of the nipple.

2. In a well casing having an underground hollow, vertically directed section with a horseshoe-shaped opening in its wall, a lower edge of which forms a sill, a laterally extending box of horseshoe contour rigidly secured to the casing section in registration with said opening with the lowermost wall of the box forming an acute angle to the axis of the casing section and having a peripheral laterally extending edge engaging the outer surface of the casing section around the major portion of the opening therein and also having an inwardly spaced rib extending into said opening and terminating at the lower end of the box in a downwardly inwardly inclined tongue extending beyond the ledge and rib and being interposed between the ends of the same, said tongue and said rib extending into said casing section opening with the tongue engaging said sill and secured thereto to direct condensation and foreign matter into said casing section, a vertical flow pipe within said casing section, a chambered, oblique lateral fitting having its main portion connection to and in communication with the flow pipe, a nipple having an intermediate portion rigidly mounted in the lower wall of said box and connected at its inner end to a portion of the fitting, and a supply pipe connected to the outer end portion of the nipple.

3. In a well casing having an underground hollow section with an ovate opening in its wall with stock of the casing section surrounding the opening, the lower edge of said wall opening being transverse to the axis of the hollow section and forming a sill, a laterally extending box of ovate contour applied to the casing section in registration with said opening with the lowermost wall of the box forming an acute angle to the axis of the casing section and having a peripheral laterally extending ledge overlapping the stock of the casing section around the major portion of its opening and welded thereto, said ledge having an inwardly spaced peripheral rib broken and terminating at the lower end of the box, there being a downwardly inwardly inclined tongue interposed between the lower ends of the rib, said tongue and said peripheral rib extending into said casing section opening with said tongue seating on said sill and welded thereto, a flow pipe within said casing section, a chambered, oblique lateral fitting having its main portion connected to and in communication with the flow pipe with its oblique portion projecting into and accommodated by said box, a nipple rigidly mounted in the lower wall of said box and connected at its inner end to a portion of the fitting, and a supply pipe connected to the outer end portion of the nipple.

4. In a well casing having an underground hollow section with an ovate opening in its wall, an edge of which forms a sill, a laterally extending box of ovate contour rigidly secured to the housing in registration with said opening with the lowermost wall of the box forming an acute angle to the axis of the casing section, said box having a peripheral laterally extending ledge with an inwardly spaced peripheral rib broken at the lower end of the box, a downwardly inwardly inclined tongue interposed between the ends of the ledge, said tongue and said peripheral rib extending into said casing section opening with the tongue engaging said sill, the upper end portion of said ledge being slightly outwardly offset to engage outer surface portions of the casing section, a flow pipe within said casing section, a chambered, oblique lateral fitting having its main portion connected to and in communication with the flow pipe, a nipple rigidly mounted in the lower wall of said box and connected at its inner end to a portion of the fitting, and a supply pipe connected to the outer end portion of the nipple.

5. In a well casing having an underground hollow section with an ovate opening in its wall, a lower edge of which forms a sill, a laterally extending box of ovate contour rigidly secured to the housing in registration with said opening with the lowermost wall of the box forming an acute angle to the axis of the casing section, said box having a peripheral laterally extending ledge with an inwardly spaced peripheral rib, both of which are broken at the lower end of the box, a downwardly inwardly inclined extended tongue interposed between the broken portions of the ledge and rib, said tongue and said peripheral rib extending into said casing section opening with the tongue engaging said sill, the upper end portion of said ledge being slightly outwardly offset, a portion of said rib formed on said offset being inclined to enter the casing section opening and an adjacent portion of said offset also being formed with a groove, a flow pipe within said casing section, a chambered, oblique lateral fitting having its main portion connected to and in communication with the flow pipe, a nipple rigidly mounted in the lower wall of said box and connected at its inner end to a portion of the fitting, and a supply pipe connected to the outer end portion of the nipple.

6. In a well, a vertical casing having an ovate opening in its wall surrounded by the stock of the casing, the lower edge of which forms a sill, a laterally offset ovate box rigidly secured to the casing over said opening communicating with the interior of the casing and forming a pocket oblique to the axis of the casing, said box having a peripheral laterally extending ledge overlapping the stock of the casing section around the major portion of said opening with the ledge being formed on its inner face portion with an inwardly spaced rib entering the casing opening and broken and terminating at the lower end of the box, a downwardly inwardly inclined extended tongue interposed within the break in the lower end of the rib and extending into the casing opening and engaging the sill, said tongue being secured to the sill by a line of weld applied laterally of the casing, there also being a line of weld between the box ledge and the casing, a water supply pipe exteriorly of the casing, a vertical water flow pipe within the casing, a downwardly outwardly directed nipple anchored in a lower wall portion of the box oblique to the water flow pipe, an elbow connecting the supply pipe to the outer end portion of the nipple, and a fitting for forming a connection between the upper end portion of the flow pipe and the nipple, said fitting having a main body portion directly connectable with the flow pipe and a downwardly directed oblique lateral extension whereby when the fitting is lowered into the casing to connect with the flow pipe, rotation of the fitting will project the oblique lateral extension thereof into the box in registration with the nipple, there being O-ring and taper means on the lateral extension and inner end portion of the nipple for effecting a force fit between the same.

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