United States Patent

Maass

[15] 3,645,333

[45] Feb. 29, 1972

[54] PITLESS WELL ADAPTERS

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[22] Filed: **Sept. 23, 1970**

[21] Appl. No.: **74,663**

[52] **U.S. Cl.** **166/85**, 166/88

[51] **Int. Cl.** **E21b 33/03**

[58] **Field of Search** 166/85, 88

[56] **References Cited**

UNITED STATES PATENTS

2,960,166	11/1960	Haydin et al	166/85
2,946,385	7/1960	Dicken	166/85

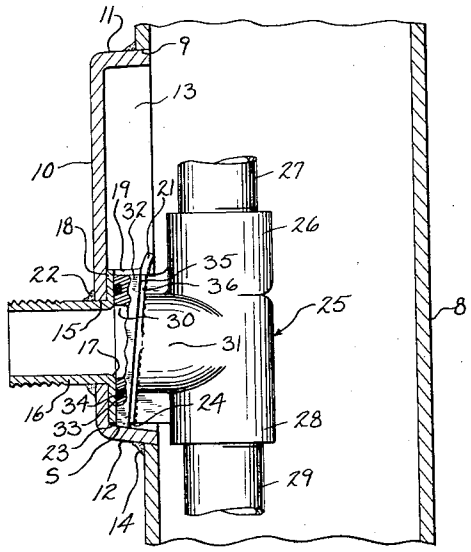
Primary Examiner—James A. Leppink

Attorney—Morsell & Morsell

[57] **ABSTRACT**

A well casing has a boxlike adapter extension projecting laterally therefrom and there is a tubular nipple extending through an upright wall of the box above the bottom thereof, the nipple carrying an enlarged stainless steel bearing face within the wall of the adapter box which bearing face is provided with integral guideways at opposite sides thereof for receiving a wedge block projecting from a bronze T-fitting, said T-fitting and wedge block having a lateral passageway registrable with the opening of the nipple. The guideways are open at the bottom to allow the lower edge of the wedge block to project a short distance therethrough so that the ends of said lower edge contact the arcuate bottom wall of the adapter box when the wedge block is in operative position with respect to the nipple. Thus the load is carried by the bottom wall of the adapter box rather than by the guideway of the nipple. The nipple and guideway are of stainless steel to prevent electrolytic action and the wedge and guideways provide for a fast sealing engagement at the end of the insertion.

10 Claims, 8 Drawing Figures



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SHEET 1 OF 2

Fig. 1

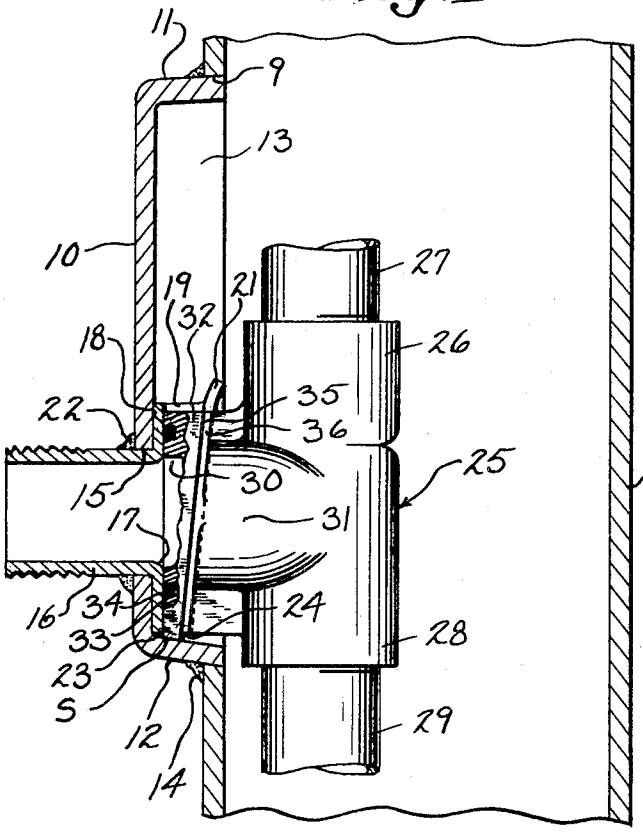


Fig. 2

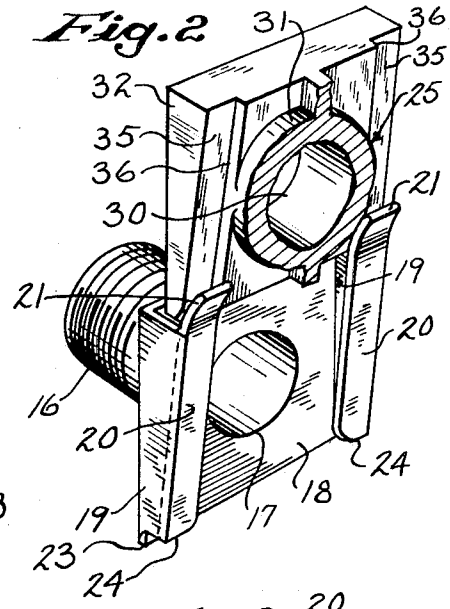


Fig. 3

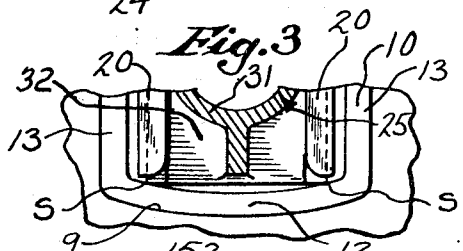


Fig. 5

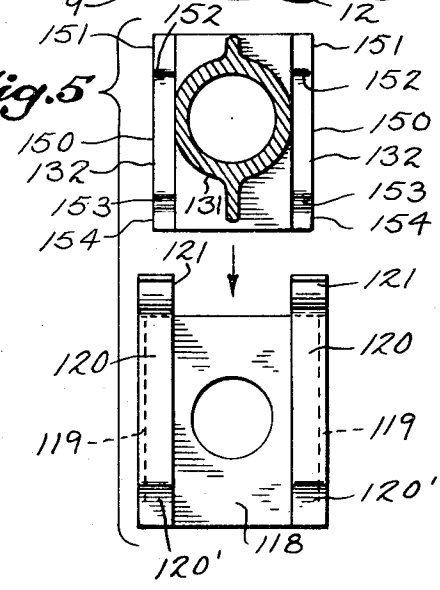
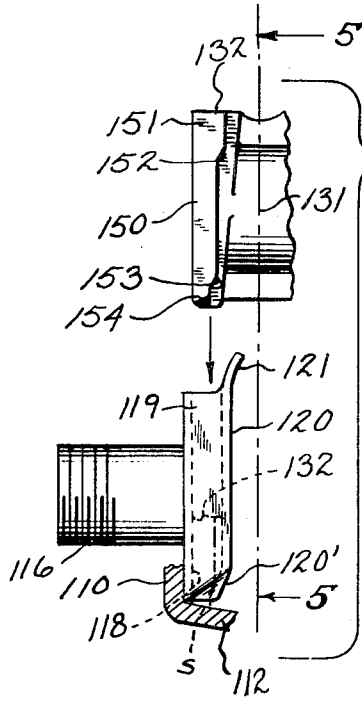


Fig. 4



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Fig. 6

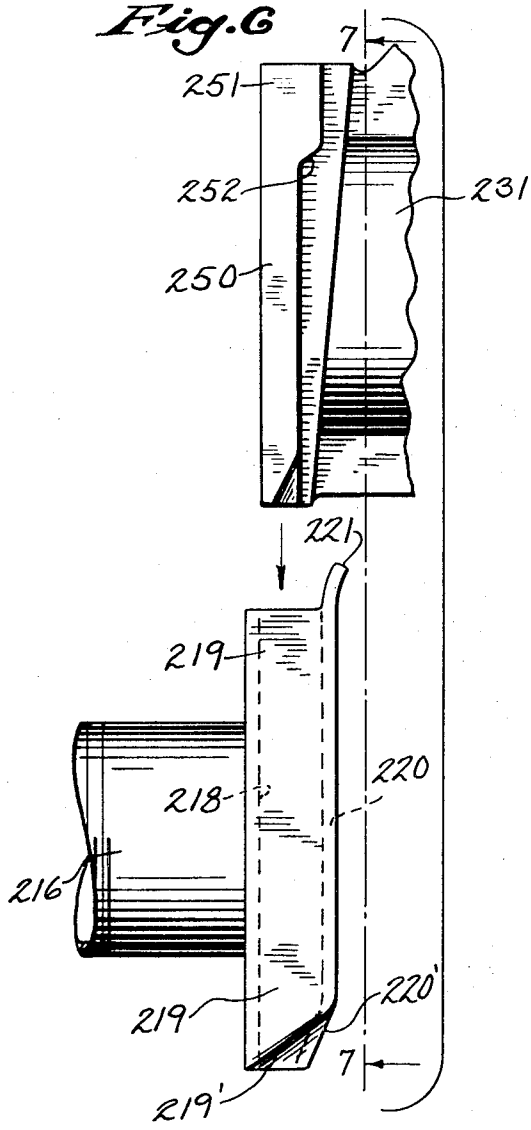
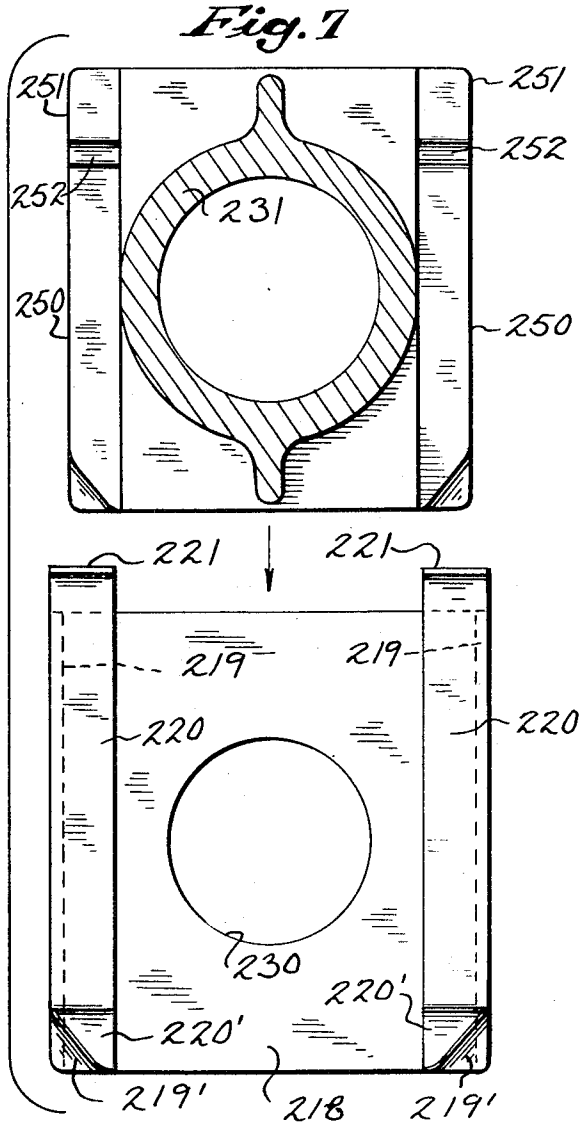


Fig. 7



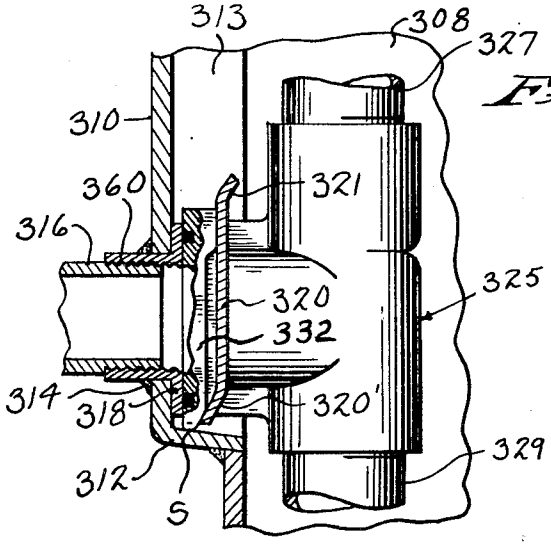


Fig. 8

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PITLESS WELL ADAPTERS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to well systems of the pitless variety, and relates to means for making a connection between the flow pipe and the casing and the laterally extending service pipe leading therefrom.

2. Description of the Prior Art

In my former patent No. 3,467,181, dated Sept. 16, 1969, a separate stainless steel bushing must be employed to prevent electrolytic action between the stationary bearing face and the bronze wedge block, the guideways for the wedge block being formed by ribs which are welded to the sides of the adapter box so that the entire load of the flow pipe and submersible pump is carried by these ribs, which ribs must be made strong and must be carefully welded to the sides of the box. In Haydin U.S. Pat. No. 2,960,166 a similar construction is illustrated but here also the load is taken by the flanges **29** which form the guideways for the wedge block, and these must likewise be made strong and the welding to the sidewalls must be carefully performed. It is less expensive from a manufacturing standpoint to be able to form the guideways separately from the adapter housing, but a problem arises with such a construction because it must be able to support the weight of the flow pipe as well as the weight of the submersible pump, which may total two tons.

The Dickens U.S. Pat. No. 2,946,385 discloses a guideway which is integral with a nipple, but this element had to be made extra strong and is provided with a bottom ledge in order to support the necessary weight.

SUMMARY OF THE INVENTION

The improved adapter provides a guideway which is so supported and positioned in an adapter housing that portions of the lower edge of the wedge block abut the bottom of the adapter box when the parts are in assembled relationship so that the load is borne by the bottom of the adapter box rather than by the guideway flanges.

A further object of the invention is to provide a construction as above described in which there is an integral service pipe nipple and bearing face with the latter forming the wedge block guideway whereby the necessity of providing a separate stainless steel bushing to prevent electrolytic action or rust is eliminated.

A further object of the invention is to provide a wedge block construction for use in pitless well adapters which permits the guideways to be of relatively lightweight stampings, and wherein the arrangement is such that the wedge block is supported on the bottom of the adapter box to relieve the guideways of any direction and strain of a type which might result in breaking of the seal between the wedge block and its mating face.

A further object of the invention is to provide an improved pitless well adapter in which the wedge block has an O-ring adapted to seal against the stationary face, the construction being so worked out as to minimize friction on the O-ring during insertion and removal of the wedge block, while still providing means for bringing the O-ring in fast and tight at the end of the insertion.

A further object of the invention is to provide a pitless well adapter of the type described which is simple in construction, inexpensive to manufacture, easy to install and manipulate when the well is being serviced, which meets all sanitary and code requirements, and which is otherwise well adapted for the purposes described.

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

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings, wherein the same reference characters designate the same or similar parts in all of the views:

FIG. **1** is a vertical sectional view through a well casing and adapter box showing the T-fitting in operative position, parts being broken away and shown in section;

FIG. **2** is a perspective view showing the wedge block about to be inserted in the guideway;

FIG. **3** is a fragmentary view, partially in vertical section looking at the inside of the box and showing the support for the lower corners of the wedge block;

FIG. **4** is a fragmentary side elevational view of a modification showing a wedge block about to be inserted in a guideway, part of the adapter box being shown in cross section;

FIG. **5** is a view taken on the line **4—4** of FIG. **3**;

FIG. **6** is a fragmentary side elevational view of a wedge block about to be inserted in a guideway, illustrating another modification;

FIG. **7** is a view taken approximately on the line **6—6** of FIG. **5**; and

FIG. **8** is a view similar to FIG. **1** showing still another modification.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now more particularly to the drawing, first to FIGS. **1** and **2**, the well casing **8** has an opening **9** in a sidewall. A steel adapter box **10** of generally rectangular form has a slightly inclined upper wall **11**, a slightly inclined lower wall **12** which is transversely curved as shown in FIG. **3**, and sidewalls **13**. The end and sidewalls of the box **10** are positioned within the margin of the opening **9**, and the box is welded in position as at **14** in the manner more fully described in my prior U.S. Pat. No. 3,467,181. The box **10** is positioned below the frost level and has a nipple or service pipe opening **15**. A stainless steel nipple **16**, for communication with a service pipe, has its inner end welded to the margin of an opening **17** in a stainless steel bearing face **18** to provide in effect an integral nipple and bearing face construction which is preferably formed of a **304** stainless steel to afford maximum resistance to electrolytic action, rust and corrosion. The bearing face **18** has bent side flanges **19** which in turn have front flanges **20** bent inwardly therefrom toward one another. The front flanges **20** have upwardly projecting, forwardly curved, guiding extensions **21**. The construction is such as to provide downwardly tapering guideways at opposite sides of the bearing face **18**, which guideways are open at the bottom.

The nipple and guideway element of FIG. **2** is installed in the manner shown in FIG. **1** with the nipple projecting through the hole **15** of the adapter box and welded in position as at **22**. When in position, the lower edge **23** of the bearing face is slightly above the bottom of the adapter box **10** but the lower ends **24** of the guideway flanges are spaced above the bottom of the adapter box as shown in FIG. **1**.

A flow pipe-supporting fitting in the form of a unitary combination T-coupling and wedge block **25** has an upper socket portion **26** to which the lower end of the drop pipe **27** is threadedly connected, and has a lower socket portion **28** to which the upper end of the flow pipe **29** is threadedly connected, the lower end of the flow pipe extending down into the well and customarily supporting a submersible pump. The unitary casting **25** is formed of bronze. It has an outlet conduit **30** in a lateral extension **31**. The outer end of the extension is in the form of a wedge block **32** having a straight flat outer face for coaction with the bearing face **18** of the nipple. The outer face of the wedge block has a circular groove **33** within which an O-ring **34** of rubberlike material is seated to project a short distance beyond the face of the wedge block.

The inner face of the wedge block is inclined as shown in FIG. **1**, and there are edge grooves **35** which coact with the guiding flanges **20**, there being shoulders **36** which ride against

the inner edges of the flanges **20**. The lower corners of the wedge block are preferably obliquely ground for easy entrance, the arrangement being such that when the wedge block is inserted in the guideways as shown in FIG. **2**, it will first rest against the extensions **21** of the flanges **20** and, as the wedge block is lowered, it will be gradually guided nearer the bearing face **18**, the tapers maintaining the sealing ring out of rubbing engagement with the bearing face until the wedge block is just about in engagement when it will be brought in fast so that the O-ring **34** will make a tight seal against the bearing face as shown in FIG. **1**. The relative position of the parts is such that when the O-ring is in tight sealing condition, with the fitting **25** in operative registration with the service pipe opening, the wedge block is supported on the bottom wall **12** of the adapter box **10**, as indicated at S in FIGS. **1** and **3**. Thus the load of the piping, together with the submersible pump carried thereby, which may exert a two-ton force in a downward direction, will be borne by the bottom **12** of the adapter housing **10**. This makes it possible to provide a guideway of FIG. **2** which is integral with the nipple and which has integral flanges **19** and **20**, which would normally be too light to withstand the downward force without becoming distorted and breaking the O-ring seal. With the present construction the guiding element only has to withstand the water pump pressure, which is a maximum of 150 pounds.

Due to the fact that the bottom wall **12** of the adapter box **10** is transversely arcuate, the engagement between the lower edge of the wedge block **32** and the bottom **12** is only at the corners as at S in FIG. **3**. Thus support is furnished by the bottom **12** of the box with only minimum contact between the bronze wedge block and the nonstainless steel wall **12**, so that any electrolytic action or corrosion which results from the contact at S is too small to be of consequence.

FIGS. **4** and **5** illustrate a modification in which all of the parts which correspond to parts of FIG. **1** are designated by the same numerals preceded by the digit "1". The principle difference in this form of the invention is that the guideways **132** are straight and of uniform width throughout the major portion of their length. At the bottom, however, the flanges **120** are bent toward the bearing face **118** as shown at **120'**. In addition, the sides of the wedge block are straight and of uniform thickness throughout the major portion of their length as at **150**. The upper ends of said portions are of increased thickness as at **151**, and there is an intervening inclined shoulder **152**. Near the lower ends the thickness **150** is gradually reduced as at **153** to merge with lower end portions **154** of substantially reduced thickness. As a result of this construction, when the wedge block is inserted in the guideway, it will be initially guided by the upwardly projecting extensions **121** of the flanges **120**, and the sealing ring will be kept out of contact with the bearing face until the shouldered portions **151** ride down the curved extensions **121**, this resulting in bringing the O-ring in fast at the end of the insertion, there also being coaction between the angle portions **153** of the wedge block and the angle portions **120'** of the guideway flanges **120**. The relative position of the parts is such, just as in the form of the invention of FIG. **1**, that the corners of the lowers edge of the wedge block are supported on bottom wall **112** of the adapter box **110**, there being enough give in the O-ring to allow the wedge to hit the bottom of the box **110**. In this form of the invention, as in the form of FIG. **1**, the nipple **116**, with its integral bearing face **118** and flanges **119** and **120**, is formed of stainless steel, and the wedge block **150** is a part of a unitary T-coupling and wedge block element just as the element **25** of FIG. **1** which is formed of bronze.

The form of the invention shown in FIGS. **6** and **7** is similar to the form of the invention of FIG. **4** and is used in the same way. Here all of the corresponding elements are designated by the same reference numerals used in FIG. **1** but preceded by the digit "2". In this form of the invention all of the parts operate similarly to those previously described in connection with FIGS. **4** and **5**. However, at the bottom of the guideways, in addition to having the flanges **220'** tapered for the same purpose heretofore described in connection with the flange **120'** of FIG. **4**, the side flanges **219** have their lower ends obliquely tapered as at **219'**. This aids in centering the wedge block and in forming a tight seal at the end of the insertion.

In the form of the invention of FIG. **8** all of the corresponding parts are identified by the same numerals as used in FIG. **1** preceded by the digit "3". Here the nipple **316** is separate and there is a separate stainless steel bushing **360** which carries the stainless steel bearing face **318**. In this form of the invention the bearing face does not provide the guideways. Instead, guideway forming members **320** are welded to the sides **313** of the adapter box **310**. These guideways are separated the same as in FIG. **3** and provide an outwardly curved, upwardly projecting extension **321**, and inwardly angled lower end portions **320'**. This construction differs from the arrangement of my prior U.S. Pat. No. 3,467,181 in that the guideways **321** which are welded to the sides of the box **310** can be made lighter weight because the relationship of parts is such that the lower corners of the wedge block **332** are supported as at S on the bottom wall of the casing. Thus the flange **320** does not have to stand the load.

It is to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

What I claim is:

1. In a pitless well adapter having a box with a back and a bottom wall, and having a service pipe opening in said back, a bearing surface supported in said box and having an opening in registration with the service pipe opening in said back, a flow-pipe-supporting fitting having a laterally projecting wedge block with a bearing surface, said fitting having a liquid opening through said wedge block which is complementary to the service pipe opening of the box, guideway means in said box positioned to slideably receive said wedge block and to guide it to and from a position in which its opening is in registration with said service pipe opening, the improvement comprising having the lower end of said guideway means sufficiently open that the lower edge of the wedge block projects a short distance therethrough into contact with the bottom wall of said box, whereby the latter may support the load on the fitting, the parts being so positioned relative to one another and relative to the bottom of the box that there is supporting engagement between the wedge block and the bottom of the box at the same time that the fitting is in operative registration with the service pipe opening, the bottom of the box being laterally curved so that only the lower edge corners of the wedge block are in supporting engagement with said bottom wall.

2. In a pitless well adapter having a box with a back and a bottom wall, and having a service pipe opening in said back, a bearing surface supported in said box and having an opening in registration with the service pipe opening in said back, a flow-pipe-supporting fitting having a laterally projecting wedge block with a bearing surface, said fitting having a liquid opening through said wedge block which is complementary to the service pipe opening of the box, guideway means in said box positioned to slideably receive said wedge block and to guide it to and from a position in which its opening is in registration with said service pipe opening, the improvement comprising having the lower end of said guideway means sufficiently open that the lower edge of the wedge block projects a short distance therethrough into contact with the bottom wall of said box, whereby the latter may support the load on the fitting, the parts being so positioned relative to one another and relative to the bottom of the box that there is supporting engagement between the wedge block and the bottom of the box at the same time that the fitting is in operative registration with the service pipe opening, the bearing surface which is supported in the box being a stainless steel stamping having side flanges bent to provide the guideway for the wedge block.

3. In a pitless well adapter having a box with a back and a bottom wall, and having a service pipe opening in said back, a bearing surface supported in said box and having an opening

in registration with the service pipe opening in said back, a flow-pipetsupporting fitting having a laterally projecting wedge block with a bearing surface, said fitting having a liquid opening through said wedge block which is complementary to the service pipe opening of the box, guideway means in said box positioned to slideably receive said wedge block and to guide it to and from a position in which its opening is in registration with said service pipe opening, the improvement comprising having the lower end of said guideway means sufficiently open that the lower edge of the wedge block projects a short distance therethrough into contact with the bottom wall of said box, whereby the latter may support the load on the fitting, the parts being so positioned relative to one another and relative to the bottom of the box that there is supporting engagement between the wedge block and the bottom of the box at the same time that the fitting is in operative registration with the service pipe opening, the guideway means including oppositely disposed, upright elements spaced inwardly from the bearing surface which is supported in the box, and having upwardly projecting, inwardly curved extensions, the wedge block having side portions fitting between said guideway elements and the last-mentioned bearing surface, and said upwardly projecting extensions of the guideway elements being adapted to coact with the wedge block during insertion to facilitate insertion movement.

4. In a pitless well adapter having a box with a back and a bottom wall, and having a service pipe opening in said back, a bearing surface supported in said box and having an opening in registration with the service pipe opening in said back, a flow-pipe-supporting fitting having a laterally projecting wedge block with a bearing surface, said fitting having a liquid opening through said wedge block which is complementary to the service pipe opening of the box, guideway means in said box positioned to slideably receive said wedge block and to guide it to and from a position in which its opening is in registration with said service pipe opening, the improvement comprising having the lower end of said guideway means sufficiently open that the lower edge of the wedge block projects a short distance therethrough into contact with the bottom wall of said box, whereby the latter may support the load on the fitting, the parts being so positioned relative to one another and relative to the bottom of the box that there is supporting engagement between the wedge block and the bottom of the box at the same time that the fitting is in operative registration with the service pipe opening, the guideway means including oppositely disposed, upright elements spaced inwardly from the bearing surface which is supported in the box, said elements having lower ends which are curved inwardly toward the back wall of the box, the wedge block having lower side portions shaped to coact with said lower and curved portions to accelerate movement of the wedge block toward sealing engagement at the end of insertion.

5. A pitless well adapter as claimed in claim 3 in which the upright guideway elements have lower ends which are curved inwardly toward the back wall of the box, the wedge block having lower side portions shaped to coact with said lower end curved portions to accelerate movement of the wedge block toward sealing engagement at the end of insertion.

6. A pitless well adapter as claimed in claim 3 in which the side portions of the wedge block have opposite edge grooves receiving said guiding elements.

7. A pitless well adapter as claimed in claim 3 in which the opposite portions of the wedge block which slideably fit within the guideway elements have upper end portions of increased thickness to coact with said guideway elements in producing a fast engagement at the end of the insertion stroke.

8. A pitless well adapter as claimed in claim 7 in which said upper portions of increased thickness are connected by angular shoulders with the portions therebelow.

9. A pitless well adapter as claimed in claim 5 in which said side portions of the wedge block have lower ends of decreased thickness for coaction with the inwardly bent lower portions of the guiding elements.

10. A pitless well adapter as claimed in claim 2 in which the fitting and wedge block are formed of bronze.

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