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WELL FIXTURE SEAL

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FIG. 1.

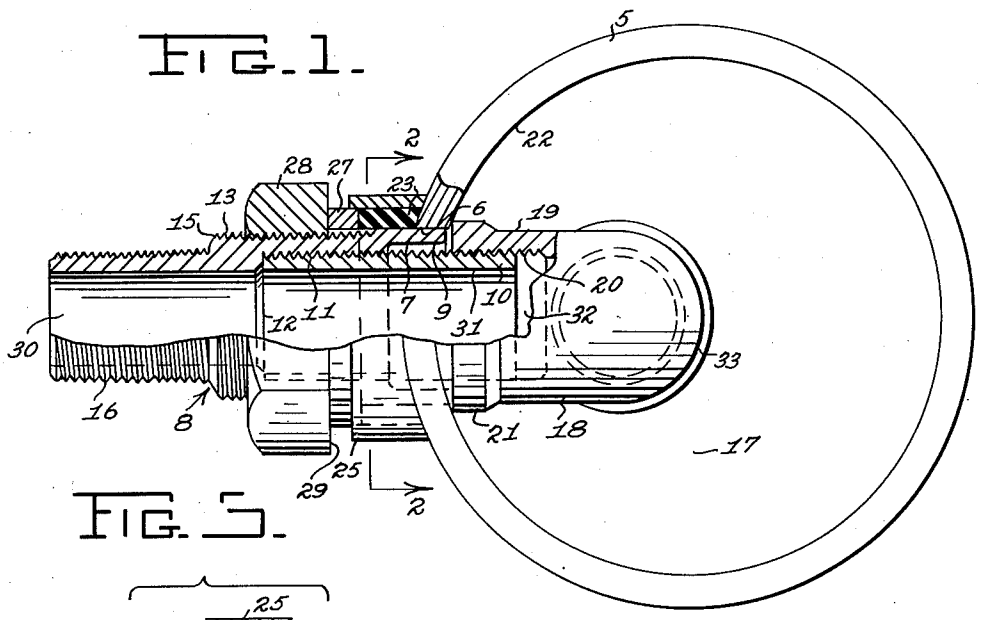


FIG. 3.

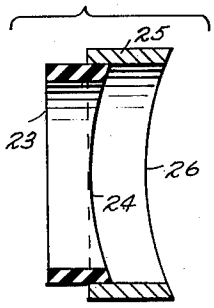


FIG. 4.

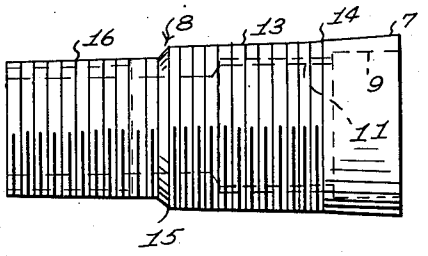
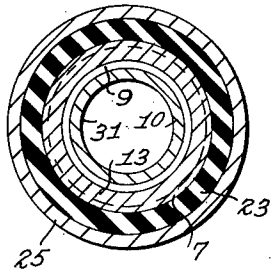


FIG. 2.



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WELL FIXTURE SEAL

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3 Claims. (Cl. 285—30)

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This invention relates to well fixtures and connections, and particularly to a well fixture provided with a special seal for ensuring a fluid-tight connection between the fixture and the casing of the well.

The main object of our invention is to provide a novel form of fixture or connection to a well through a side hole in the wall of the casing thereof in a rigidly-fixed and fluid-tight condition without the necessity of threading the hole.

Another object is to include in combination with the fixture a resilient sealing member with means for exerting axial pressure thereon in order to spread the sealing member and produce a sealed connection between the fixture and the well casing.

A further object is to provide an adapter with an end portion extending through the side hole in the well casing wall and serving to cooperate with an outer collar to form a pressure chamber for receiving a resilient pressure member and a pressure ring for exerting pressure on the pressure member and thereby forming a seal between the adapter and the well casing.

It is also an object to provide substantially simple yet very effective means for quickly and firmly connecting the fixture or adapter to the casing of the well without requiring special precautions to be observed to obtain a fluid-tight connection.

A practical object is, of course, to have but a few simple parts associated to form the connection to the well without sacrificing any advantage of the invention due to the simplicity or small number of parts.

Other objects and advantages of the invention will appear in further detail as the specification proceeds.

In order to facilitate ready comprehension of this invention for a proper appreciation of the salient features thereof, the invention is illustrated on the accompanying drawing forming part hereof, and in which:

Figure 1 is an elevation of a well fixture made according to the invention and embodying the same in a practical form, the fixture being applied to a well casing viewed from the upper end thereof, parts being broken away to disclose constructional details and relations of parts;

Figure 2 is a transverse section taken on line 2—2 in Figure 1;

Figure 3 is a section of the profile collar forming the outer wall of a pressure chamber in the fixture assembly and resilient pressure or sealing

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member adapted to fit within the mentioned profile collar;

Figure 4 is a side elevation of the adapter alone which forms the basic element of the fixture of Figure 1.

In the views, the same reference numerals indicate the same or like parts.

It is frequently desirable to make pipe connections to well casings and pipes of large diameter through the walls thereof, but it is always a problem to make an effective and fluid-tight connection therewith. Despite the problem involved, it is often actually necessary to make such connections to well casings below the frost line in the ground in order to obtain water, for example, during the cold season, and also to make connections to oil well casings and the like.

As the problem involved in making such connections effective and fluid tight is unavoidable, we have considered the same, and as a result have succeeded in producing a well fixture with a seal combined therewith and forming part and parcel thereof, which ensures a tight connection between the fixture and the well casing involved, as will now be more fully described.

Hence, in the practice of our invention, and referring again to the drawing, through the wall of a well casing 5 is drilled a hole 6 of sufficient size to fit the larger outer diameter of a tapering skirt portion 7 upon the inner end of an adapter, generally indicated at 8, the interior of the skirt portion 7 at 9 forming a bore free from threads to provide a clearance space for an externally-threaded nipple 10 screwed into the internal threads 11 of the adapter immediately within the clearance bore 9 thereof, the inner end of nipple 10 abutting the inner shoulder 12 within the internally-threaded portion 11 of the adapter. Externally upon adapter 8 is a thread 13 extending from the inner end 14 of tapering skirt portion 7 and an intermediately-located shoulder 15 beyond which the adapter has an externally-reduced diameter and has a pipe thread 16 for connection to a pipe union or elbow, as may be required.

When the adapter 8 is thrust into the aperture 6 in the wall of well casing 5 from the outside thereof with externally-threaded nipple projecting into the interior 17 of the casing, an internally-threaded elbow 18 provided within one end 19 thereof with the internal thread 20 is screwed on the inner end of nipple 10 until the reinforcing flange 21 on end 19 of the nipple encounters the interior surface 22 of the well casing 5. In-

troduction of the fixture into the hole 6 in the well casing wall may, of course, be carried out in another manner, if so desired. It is possible, and even practical in some cases, to first screw nipple 10 into the interior thread 20 of end 19 of the nipple and while holding flange 21 thereof against the interior wall 22 of the well casing with the outer end of the nipple projecting out through aperture 6, then screwing on the adapter upon the outwardly-projecting end of nipple 10 until the skirt portion 7 extends into the side hole 6 in the well casing, and either comes into contact with the flanged end 21 of nipple 18 or is spaced but a short distance therefrom. As thus far described, it is self-evident that the fixture will not provide a fluid-tight connection between the flange 21 of elbow 18 and the inner surface 22 of the well casing, even when the nipple 10 interconnects the elbow with adapter 8, which projects almost wholly outside the well casing.

In order to provide a perfect seal between the adapter and the well casing 5, the skirt portion 7 is surrounded by a resilient compression member or sealing ring 23 preferably made of artificial rubber or plastic of the Vinylite series, or of the resilient material known as neoprene. The inner end 24 of ring or sealing member 23 is preferably arcuately profiled to fit the curvature of the exterior surface of well casing 5, and externally of the sealing member or ring is mounted a pressure ring or collar 25 having the inner end thereof similarly profiled arcuately at 26 to fit the curved surface of well casing 5. Fitting loosely about thread 13 on the adapter exteriorly of the end of sealing member 23 is a short pressure ring 27. The external diameter of pressure ring 27 is such that it is capable of fitting smoothly within the outer pressure ring 25 to bear against the outer end of the resilient member 23 within the pressure collar 25. In other words, the resilient pressure member 23 occupies a pressure chamber formed between the skirt 7 and the outer pressure collar 25 with pressure ring 27 providing the pressure in an axial direction against the end of the rubber or neoprene member 23. A nut 28, which is internally threaded, is screwed upon the larger thread 13 on adapter 8 with the inner face 29 thereof bearing axially against pressure ring 27 and screwed tightly on the thread so that considerable pressure is exerted by ring 27 against the resilient sealing member 23, with the result that this sealing member tends to spread very tightly inwardly against the well casing 5, against the outer surface of skirt 7 and radially outward against the inner interior of pressure collar 25, the pressure being produced by the tension exerted upon the inner nipple 10 with the flange 21 bearing very forcibly against the interior surface 22 of well casing 5, while nut 28 through pressure ring 27 and resilient pressure member or sealing ring 23 bears against the exterior surface of well casing 5. The ultimate result is that the entire fixture including the adapter and the parts just enumerated, as well as the nipple 18, are held very rigidly in place with the resilient sealing ring 23 sufficiently distorted to completely fill the space between skirt 7 and outer pressure collar 25 in radial directions and axially between well casing 5 and the inner end of pressure ring 27 under great pressure, thoroughly sealing the connection between adapter apron 7 and the well casing.

The reduced threaded portion 16 is provided with a reduced bore 30 which communicates with the interior 31 of nipple 10, which in turn communicates with the interior 32 of elbow 18, thus providing a continuous passage for fluid from within the well out through the reduced portion 16 into whatever pipes may be connected thereto. It is, of course, intended that the lower inner end 33 of the elbow 18 will be connected to pipes depending downwardly into the interior 17 of the well casing 5 to the water or oil level, so that fluid may be obtained from the interior of the well through the fixture above described. If the fluid passing through elbow 18, nipple 10 and adapter 8 is under pressure, it is evident that there will be no leakage between elbow 18, adapter 8 on the one hand, and well casing 5 on the other hand, due to the compressed condition of the sealing member 23.

It is, of course, possible to make the nipple 10 integral with the adapter by simply having the inner end of the nipple forming an integral, externally-threaded projection extending from the end of apron 7, if so desired, this modification being obvious upon mere mention and superfluous to illustrate, and necessitating no change whatever in the external form of the adapter, the apron, sealing member 23 and the pressure collar and ring.

The arcuate profile forms of the inner ends 24 and 26 of the sealing ring 23 and outer pressure collar 25 are, of course, shaped to conform to the particular size of the well casing 5 which may be drilled with the hole 6 for applying the fixture thereto. If desired, the elbow 18 may be of the typical galvanized type, while nipple 10 may be of brass or bronze, if so desired. On the other hand, the adapter may be of bronze or steel which is also true of pressure collar 25 and pressure ring 27.

Manifestly, variations may be resorted to and parts and features may be modified or used without others within the scope of the appended claims.

Having now fully decribed our invention, we claim:

1. A well fixture seal for making a fluid-tight connection with an internally-threaded end of a pipe elbow within a well casing through a side hole in the wall of the latter, which includes an adapter having a passage therethrough, a threaded intermediate portion on the adapter for receiving a nut thereon, an externally-threaded reduced outer end portion on the adapter beyond one end of the first-mentioned threaded portion, and a skirt portion formed beyond the other end of said first-mentioned threaded portion serving to extend into the side hole in said wall casing, externally-threaded means of smaller external diameter than that of the skirt portion projecting beyond the latter through said hole into the interior of said well casing in a position to enter into threaded engagement with said internally-threaded end of said pipe elbow with said elbow engaging radially outward against the interior surface of said well casing, a resilient sealing ring surrounding the skirt portion of the adapter with one end contoured to fit against the exterior round surface of the well casing, a rigid pressure collar surrounding the resilient sealing ring and having the inner end contoured to fit against said exterior round surface of said well casing, and a pressure ring disposed between the nut and the outer end of said resilient sealing ring and extending into the outer end of said pressure collar for compressing said resilient sealing ring within the latter.

2. A well fixture seal for making a fluid tight

connection with an internally threaded end of a pipe elbow within a well casing through a side hole in the wall of the latter comprising a hollow adapter arranged exteriorly and transversely of said casing and having one end extending through said side hole and loosely supported in said hole, said adapter being internally threaded inwardly from said one end to a point adjacent to and spaced from the other end thereof, an externally threaded hollow nipple in threaded engagement with the internally threaded portion of said adapter and having one end projecting from said one end of said adapter, said projecting one end of said nipple being in threaded engagement with the internally threaded end of said pipe elbow, a resilient sealing ring surrounding said adapter and having one end bearing against the exterior surface of said casing adjacent said hole, and pressure applying means mounted on said adapter for movement into engagement with the other end of said sealing ring for sealingly securing said adapter to the portion of said casing adjacent said hole.

3. A well fixture seal for making a fluid tight connection with an internally threaded end of a pipe elbow within a well casing through a side hole in the wall of the latter comprising a hollow adapter arranged exteriorly and transversely of said casing and having one end extending through said side hole and loosely supported in said hole, said adapter being internally threaded inwardly fom said one end to a point adjacent to and spaced from the other end thereof, an externally threaded hollow nipple in threaded engagement with the internally threaded portion of said adapter and having one end projecting from said one end of said adapter, said projecting one end of said nipple being in threaded engagement with the internally threaded end of said pipe elbow, a resilient sealing ring surrounding said adapter and having one end bearing against the exterior surface of said casing adjacent said hole, a pressure ring surrounding said adapter and having one end in engagement with the other end of said sealing ring, and a nut in threaded engagement with said adapter and movable into bearing engagement with the other end of said pressure ring.

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