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LOCKING SCREW FOR WELL HEAD

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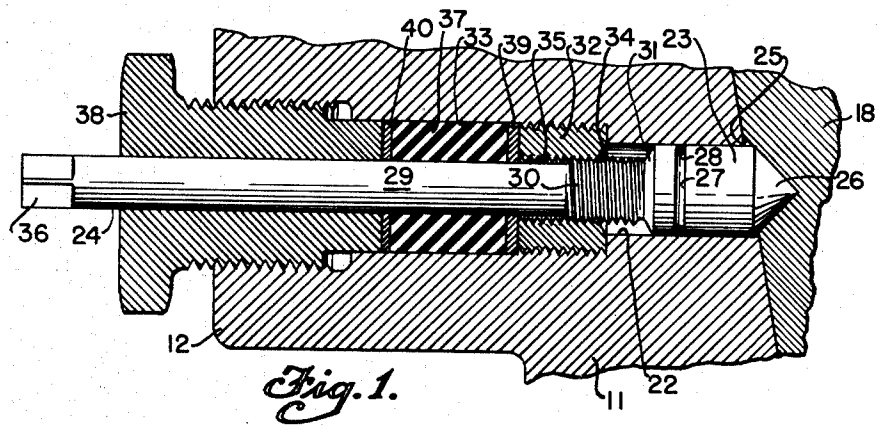


Fig. 1.

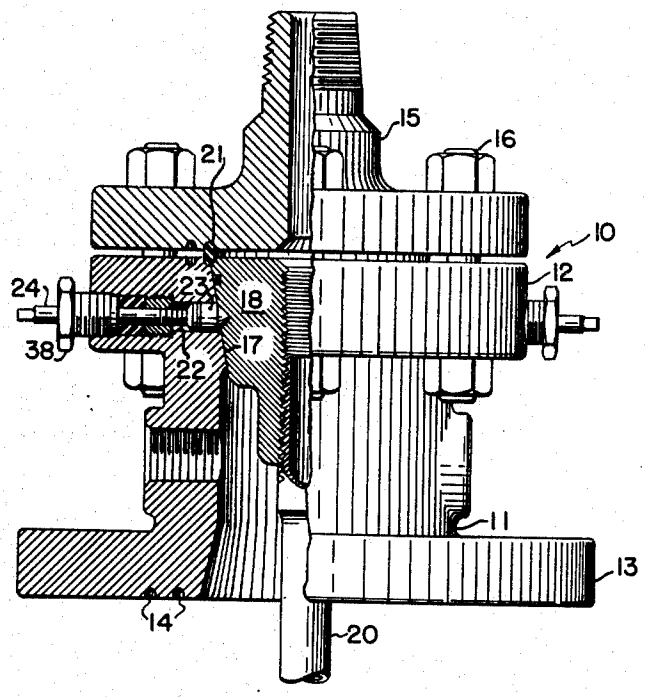


Fig. 2.

LAURENCE L. RECTOR
INVENTOR.

BY Herbert J. Brown

ATTORNEY

United States Patent Office

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LOCKING SCREW FOR WELL HEAD

Laurence L. Rector, Fort Worth, Tex.

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3 Claims. (Cl. 285—22)

This invention relates to well head assemblies for oil and gas wells, and has reference to improvements in locking screws, such as those for engaging and securing mandrel hangers, strippers or the like, in well heads.

An object of the invention is to provide a locking screw construction of the described class which may be repacked without loosing the well gas pressures.

A particular object of the invention is to avoid "killing" the well (that is, filling the same with a heavy mud to overcome formation pressures) when replacing packing around the locking screw.

Another object of the invention is to eliminate the fire hazard, due to escaping well gases, ordinarily present when replacing the referred to packing.

A further object of the invention is to prevent corrosion of threads on a locking screw of the described class by effectively sealing the inner or forward end of the screw so as to prevent the corrosive agents ordinarily present in a well from reaching such threads.

The invention will be more readily understood by reference to the accompanying drawing wherein:

Figure 1 is an enlarged broken vertical sectional view of a well head and showing a locking screw construction embodying the present invention positioned therein.

Figure 2 is a broken elevational view of a mandrel hanger type tubing head and showing locking screws made in accordance with the invention engaging a mandrel hanger supported therein.

It is to be understood that the locking screw referred to may be employed in connection with tubing strippers or the like, not shown, but, for the purpose of describing the present invention, the same is illustrated in connection with a mandrel hanger type tubing head **10** having a body **11** and upper and lower flanges **12** and **13**. The lower surface of the lower flange **13** is provided with annular grooves **14** for receiving sealing rings, not shown, which in turn engage the upper surface of a casing head. The tubing head **10** includes a bonnet **15** which is secured to the upper flange **12** of the body **11** by means of bolts **16**. The upper inside diameter of the body **11** is tapered, as at **17**, to receive and support a correspondingly shaped mandrel hanger **18** which threadedly supports the well tubing **20** depending therefrom. A ring seal **21** of metal or the like is provided between the bonnet **15** and the adjoining peripheries of the body **11** and the mandrel hanger **18**. The lower surface of the bonnet **15** and the adjoining upper surfaces of the body **11** and the mandrel hanger **18** are grooved, not numbered, to receive the ring seal **21**.

Horizontal bores **22** are radially disposed in the upper body flange **12** to slidably receive the cylindrical heads **23** of locking bolts **24** which are a part of the construction comprising the present invention. The tapered surface of the mandrel hanger **18** is provided with conical recesses **25** to receive the pointed ends **26** integral with the forward or inner ends of the locking screw heads **23**. At least one groove **27** is provided around each head **23** to receive an O ring **28** for engagement with the bore **22** in the body **11**. The shank **29** of the screw **24** is threaded,

as at **30**, outwardly of the cylindrical head **23** and a tapered ground surface **31** is provided between said threads and said head. A threaded seating element **32**, having a diameter larger than the bore **22**, is threadedly engaged in an enlarged portion **33** of said bore, and which element is provided with a seat **34** for receiving the tapered ground surface **31**. The inside diameter of the element **32** is threaded, as at **35**, to receive the threads **30** on the screw shank **29**. The outer end of the screw **24** extends beyond the outer surface of the upper body flange **12** and is provided with wrench surfaces **36** for turning the shank **29** and moving the screw head **23** inwardly or outwardly as required. A packing **37** is provided in the enlarged portion **33** of the bore **22**, and a packing gland **38** is threadedly engaged in the peripheral surface of the upper body flange **12**. Flat rings **39** and **40** are positioned on opposite ends of the packing **37** and respectively engage the ends of the threaded element **32** and the packing gland **38**.

In operation, after the tubing **20** has been landed, the locking screws **24** are turned to cause their pointed ends **26** to engage the conical recesses **25** in the mandrel hanger **18**. The O ring **28** prevents corrosive fluids from the well from reaching the threads **30** on the screw stem **29**. When new packing **37** is required, the lock screw shanks **29** are turned in a direction so as to cause the ground surface **31** on the head **23** to engage the seat **34** in the threaded element **32**. Thus, the gland **38** can be removed while the gas pressure is retained within the well, eliminating the fire hazard hereinbefore referred to, and avoiding "killing" the well as described in the foregoing.

The present invention is not limited to the construction herein shown and described, but may be made in many ways within the scope of the appended claims.

What is claimed is:

1. In combination with a well head body and a mandrel hanger supported therein, a locking screw construction comprising a shank within a horizontal radial opening in said well head body, a cylindrical head secured to the inner end of said shank and having a tapered end on the inner end thereof adapted to be received within a corresponding recess in the side of said mandrel hanger, an internally threaded valve seat element fixedly mounted within said opening and outwardly of said head, threads on said shank engaging the internal threads of said element, a packing gland around said shank and detachably secured in the outer end of said opening, a packing between said internally threaded element and said packing gland, and coengageable surfaces on the opposing ends of said cylindrical head and said valve seat element.

2. In combination with a well head body and a mandrel hanger supported therein, a locking screw construction as defined in claim 1 and wherein an annular groove is provided around said cylindrical head, and an O-ring is received in said groove for coaction with said radial opening.

3. In combination with a well head body and a mandrel hanger supported therein, a locking screw construction as defined in claim 1 and wherein said valve seat element is threadedly engaged in said opening in said well head body, and wherein the said coengageable surfaces are correspondingly tapered and provided with ground finish surfaces.

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