Oct. 29, 1957 J. B. GREER 2,811,067

INTERNAL EXPANDING PIPE WRENCH

Filed Oct. 20, 1955

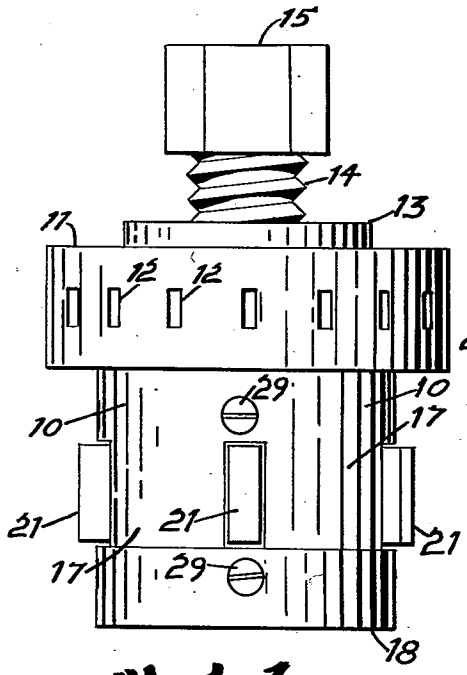


Fig 1

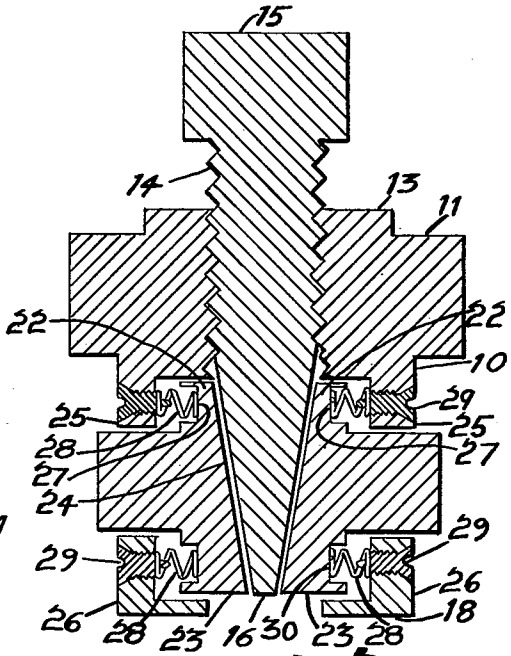


Fig 2

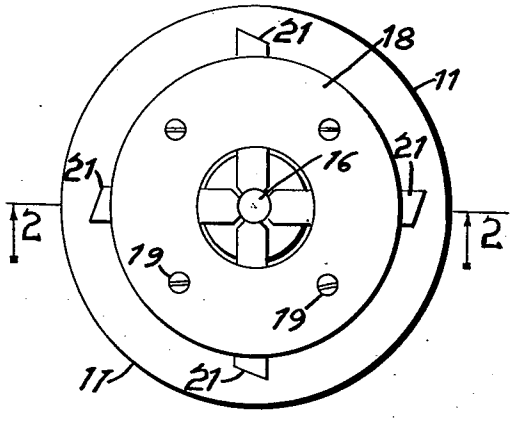


Fig 3

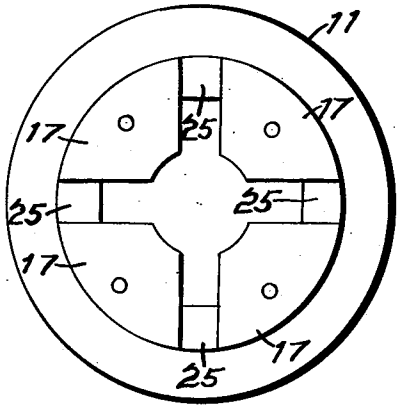


Fig 4

United States Patent Office

2,811,067

Patented Oct. 29, 1957

2,811,067

INTERNAL EXPANDING PIPE WRENCH

James B. Greer, Abilene, Tex.

Application October 20, 1955, Serial No. 541,812

1 Claim. (Cl. 81—72)

My invention relates to a backout tool for threaded pipe of the type which engages the inner surface of the pipe in order to turn same in left hand rotation. In pipe fitting there will occasionally be a piece broken off leaving the short end already threaded into the valve, coupling or other fitting. This short end is called a "Dutchman," and has no outside surface which may be gripped by a wrench for backing it out.

The object of my invention is to provide a backout tool of size adapted to fit into a pipe of given dimension provided with teeth which may be forced outwardly into engagement with the inner surface of the pipe by means disposed axially at the center of the tool and provided with means whereby it may be turned after said teeth are so engaged.

With these and other objects in view my invention resides in the construction and arrangement of parts herein fully described, and particularly pointed out in the claims.

Referring now to the drawings, which are a part of this specification, and in which like characters indicate like parts:

Fig. 1 is an elevation of my backout tool;

Fig. 2 is a vertical section of same taken on line 2—2 of Fig. 3;

Fig. 3 is a bottom view of same; and

Fig. 4 is a bottom view of the upper portion with the teeth and the bolt removed.

The upper portion of my backout tool is integral and consists of cylindrical portions of different diameter. The lower portion **10** is of the proper size for insertion into the broken off piece of pipe, a different size being required when the pipe is appreciably larger or smaller. The middle portion **11** is of larger diameter and is provided on its outer surface with a series of notches **12** so that the tool can be turned by a ratchet wrench such as is used with a pipe die. The portion **13** is short vertically and of smaller diameter. The upper portions **11** and **13** are tapped through the center to receive the upper threaded end **14** of a bolt which has either a square or hexagonal head **15**, the lower portion **16** being round but cut to a taper.

In the lower portion **10** there are cut upwardly from the bottom four radial slots at right angles to each other, leaving a quadrant **17** between each of two adjoining slots. Each slot is cut deeper vertically from the center outward leaving an annular portion **25** at the upper edge of each slot. The bottom piece **18** of the backout tool is of the same outside diameter as the portion **10** and has four radial slots to correspond with the deep portions of the slots in the portion **10** leaving an intact annular

portion at the outer edge to correspond to the annular portion **25**. The bottom piece **18** is fastened to the lower portion **10** by means of screws **19** passing through holes in the bottom piece and threaded into the quadrants **17**.

A tooth slides in each one of the four radial slots cut in the pieces **10** and **18**. Each tooth is substantially T-shaped and has a shank **20** at its outer end with parallel horizontal sides guided in that portion of the slot between the annular portion **25** of the piece **10** and the corresponding annular portion of the piece **18**. The outer end of each shank **20** is cut at an angle to provide a tooth **21** to engage the inside of the pipe for left hand rotation. The inner end of each tooth has a part **22** extending upward and a part **23** extending downward, and the whole inner end is cut on a slanting surface **24** to bear against the tapered portion **16** of the bolt.

The upper part **22** of each tooth is provided with a seat **27** for an expansion spring **28** and a set screw **29** is threaded through the annular portion **25** to bear against the spring **28**. Likewise the lower part **23** of the tooth is provided with a seat **30** for such an expansion spring, and a similar set screw is threaded through the annular portion of the bottom piece **18** to bear against the spring. The two springs **28** for each tooth tend to move the tooth inward bringing the slanding surface **24** to bear against the tapered portion **16**.

In the operation of my backout tool the bolt **14** is screwed upward so that the teeth **21** will hardly protrude. The tool is then inserted in the broken piece or dutchman and the bolt **14** screwed downward to force the teeth **21** into engagement with the inside surface of the broken piece. The ratchet wrench is then fitted over the portion **11** and turned to the left to back the broken piece out of the fitting. The bolt **14** may then be screwed upward to loosen the hold of the teeth **21** on the broken piece.

What I claim as new, and desire to secure by Letters Patent of the United States, is:

A cylindrical body having an enlarged upper portion and a lower portion adapted to fit and rotate within a pipe, a cover piece fitting under and fastened to said lower portion, said lower portion and cover piece each being provided with a plurality of radial slots, said slots being in respective alignment one with the other, a plurality of teeth respectively slidable in said aligned slots, each tooth having a central shank extending outwardly so that its outer edge can engage the inside of a pipe, each tooth having widened parts extending upwardly and downwardly from said shank, an annular portion of said lower portion extending downwardly substantially the heighth of the upper parts of said teeth, springs interposed between each of the upper parts of the teeth and said annular portion, an annular portion of said cover piece extending upwardly substantially the heighth of the lower parts of said teeth, springs interposed between each lower part of said teeth and said second annular portion, and means mounted on said upper portion and engaging said teeth for extending outwardly pressure thereon.

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