No. 667,194. Patented Feb. 5, 1901.

E. R. CURTIN.

OIL WELL PIPE AND CASING SPEAR.

(Application filed May 14, 1900.)

(No Model.)

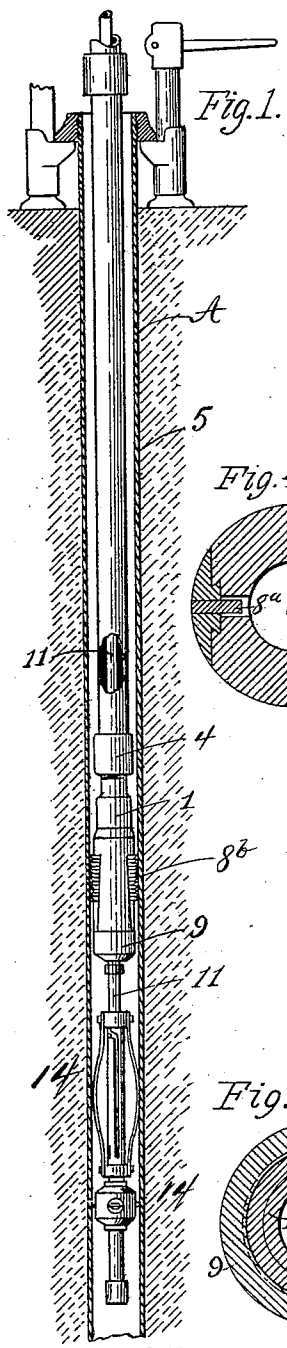


Fig. 1.

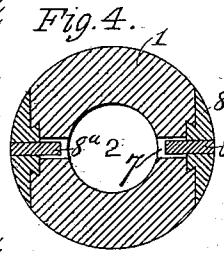


Fig. 4.

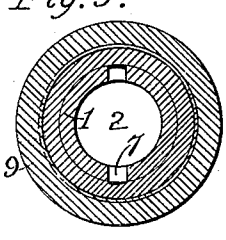


Fig. 5.

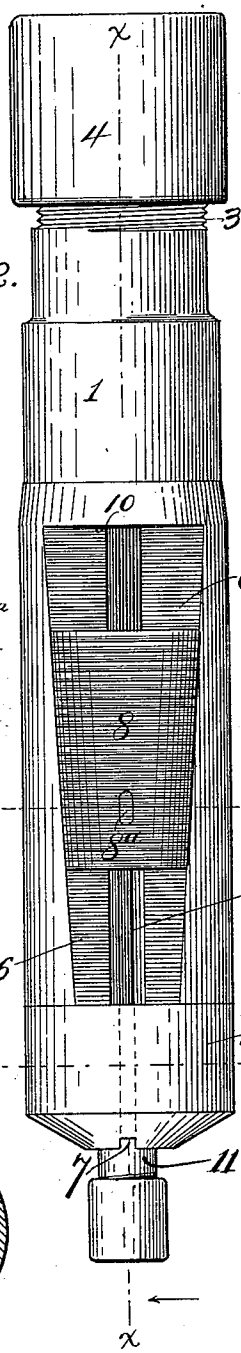


Fig. 2.

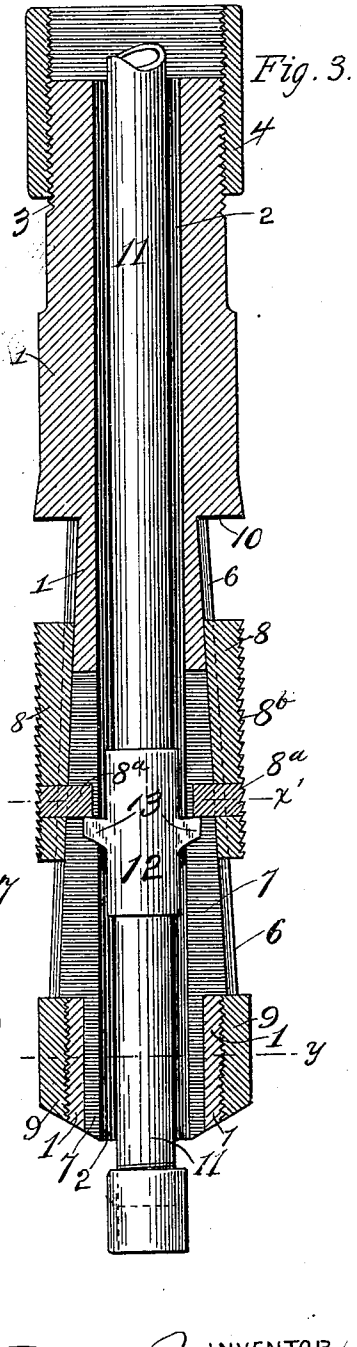


Fig. 3.

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OIL-WELL PIPE AND CASING-SPEAR.

SPECIFICATION forming part of Letters Patent No. 667,194, dated February 5, 1901.

Application filed May 14, 1900. Serial No. 16,575. (No model.)

To all whom it may concern:

Be it known that I, EMMETT R. CURTIN, a citizen of the United States, residing at Lima, in the county of Allen and State of Ohio, have invented certain new and useful Improvements in Oil-Well Pipes and Casing-Spears; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

Nearly all oil and gas wells have from thirty to five hundred feet of what is known as "drive-pipe" driven in at the bottom of the well. When these wells prove a "dry hole" or small producers or when for any reason the well is abandoned, it is desirable to remove and save the drive-pipe for use in other places. The removal of the pipe is usually accomplished by placing powerful hydraulic jacks under the head or top collar of the drive-pipe, as shown in Figure 1, and by the lift of the jacks pulling the pipe bodily step by step out from the well. It sometimes happens, however, especially where the pipe is driven into the rock, that the resistance is so great that the pipe is pulled in two. This may be due to several causes—such, for instance, as a flaw in the iron or a threaded coupling in the pipe being damagd or smashed in driving the pipe into the well. When the top of the drive-pipe pulls off, it is usually regarded as evidence that the pipe is so firmly wedged in place that it is useless to make further effort to remove it, and thus large quantities of valuable pipe are every year lost and abandoned.

The object of my invention is to overcome the difficulties here indicated and to furnish a device by means of which a drive-pipe or other pipe or such part of it as is not hopelessly fastened in the well may be recovered. I attain this object by means of a device known to oil and gas well operators as a "spear" and by means of the mechanism and arrangement of parts hereinafter described, and shown and illustrated in the accompanying drawings, in which—

Fig. 1 is a central vertical sectional view of a well with my apparatus in place therein, as hereinafter described; Fig. 2, a side elevation of my spear; Fig. 3, a central vertical sectional elevation of the same on line x x, Fig. 2; Fig. 4, a transverse sectional view on line x' x', Figs. 2 and 3; and Fig. 5, a transverse sectional view on line y y, Figs. 2 and 3.

Like numerals and letters of reference indicate like parts throughout the drawings.

In the drawings, 1 is the barrel of my device, of slightly less diameter than the pipe or tube A to be operated upon. This barrel has an axial bore 2 extending therethrough and open at both ends. At top the barrel is screw-threaded, as at 3, to receive a threaded sleeve 4, by means of which my device is coupled to a pipe or tube 5, by means of which the spear is operated. The barrel at diametrically opposite sides is flattened, as at 6, and the plane surfaces are inclined at an angle to the axis of the barrel, forming a wedge-like portion of the barrel, the smaller part of the wedge being uppermost. Through the longitudinal center of the flat wedge-surfaces are slots 7, extending quite through the walls of the barrel and through its lower end.

8 8 are sliding expansion-pieces resting upon the flat surfaces 6, their exterior surfaces forming an arc of the circumference of the barrel, the interior flattened surfaces being chamfered to conform to the angle of the wedge-like surfaces 6. Upon their inner surfaces each of the pieces 8 is provided with a longitudinal projection dovetailed in transverse section, which projection engages a corresponding recess or groove in the inclined surface 6. This arrangement permits the pieces 8 to slide upon the surfaces 6 without becoming disengaged. At bottom the barrel 1 is provided with a threaded sleeve 9, which permits the assembling of the parts and which serves as a stop to limit the downward movement of the pieces 8. The upward movement is limited in corresponding manner by the shoulders 10 at the top of the inclined surfaces 6. The outer surfaces of the pieces 8 are corrugated or toothed circumferentially. The pieces 8 are provided with lugs 8^a, which project inwardly into the slot 7 nearly to the bore of the barrel.

11 is a pipe or rod passing through the axial bore of the barrel and is provided with a collar 12 within the barrel, the collar having lugs 13, which project into the slots 7 beneath the lugs 8^a on the expansion-pieces 8. The pipe or rod 11 is also provided at bottom with an expansible pipe or tube cutter 14 of any preferred construction.

The operation of my device is as follows: Assume that the pipe or tube A which is sought to be recovered has in the attempt to pull it from the well been broken off below the surface of the ground. The apparatus is now lowered a short distance into the pipe or tube A by adding at top sections to the pipe 5 and the rod or tube 11. The hydraulic jacks are now applied to a collar upon the pipe or tube 5, which is thus lifted. The upward movement of the spear, by means of the contacting wedge-like surfaces of the expansion-pieces 8 and the inclined planes 6, forces the parts 8 horizontally outward, causing the sharp teeth 8^b to bite into and firmly engage the inner surface of the pipe or tube A. Now if good fortune attends the operator the piping or tubing and the hoisting apparatus will be slowly withdrawn from the well; but if it is found that the pipe A does not yield the pipe or tube 11 is lowered until the cutter 14 is just above the shoe on the bottom of the drive-pipe, where the difficulty is frequently located. Now the rotation of the pipe or tube 11 will cause the cutters in the cutter 14 to expand and to cut the pipe off above the shoe. When the operation of cutting is complete, the pipe A being under great tension the completion of the operation will be indicated by a jar upon the pipe. The opposite rotation of the pipe or tube 11 will now retract the cutters and the pull of the hydraulic jacks may be continued. If the cutting has been above the obstruction, the pipe A and its contents may now be removed from the well. If, however, it is found that the pipe A still does not yield, the pipe or tube 11 is raised a short distance and the pipe A is again cut off, and this operation of cutting higher and higher is continued until the pipe A yields to the pull of the spear. If it is found that the pipe is immovably fastened, so that the spear will not pull out any part of it, it now becomes important to recover the spear and cutter. This is accomplished as follows: The rod or tube 11 is raised until the lugs 13, entering the slot 7, come in contact with the lugs 8^a, causing the expansion-pieces 8 to travel upon the inclined surfaces 6 and causing the teeth 8^b to loose their hold and retreat toward the axis of the spear. The spear is now disengaged from the interior of the pipe A, and the spear and cutting apparatus may be withdrawn from the well.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a casing-spear, a barrel having an axial bore therethrough, a pipe or rod in said bore, expansion-pieces on said barrel adapted to engage the interior of a pipe or tube, and means controlled by said axial rod or pipe for retracting said expansion-pieces.

2. In a casing-spear, a barrel having oppositely-inclined plane surfaces, toothed expansion-pieces slidably secured upon said surfaces, a pipe or rod passing through an axial bore in said barrel, and lugs or arms upon said pipe or rod adapted to engage and to actuate said expansion-pieces.

3. In a casing-spear, a barrel having an axial opening therethrough, a rod or tube passing through said axial opening, expansion members on said barrel adapted to engage the interior of a pipe or tube, means controlled by said axial rod or pipe for releasing the expansion members from such engagement, and a pipe-cutter on said rod or tube below said barrel.

4. A casing-spear comprising a barrel having an axial bore therethrough, a tubular or hollow support for said barrel, a rod or tube passing through said tubular support and through the axial bore of the barrel, expansion members on said barrel arranged to be projected by the upward movement of the barrel, means for retracting said expansion members by the upward movement of the axial rod or tube, and a pipe-cutter on said rod or tube below the barrel.

In testimony whereof I affix my signature in presence of two witnesses.

EMMETT R. CURTIN.

Witnesses:
W. L. MACKENZIE,
CARRIE HUTCHISON.