No. 668,340. Patented Feb. 19, 1901.

# W. PLOTTS.

## REAMER FOR OIL OR LIKE WELLS.

(Application filed May 6, 1897.)

(No Model.)

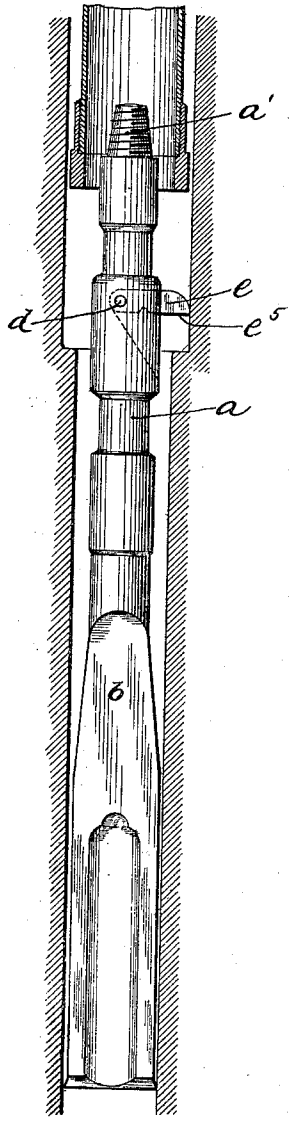



Fig. 1

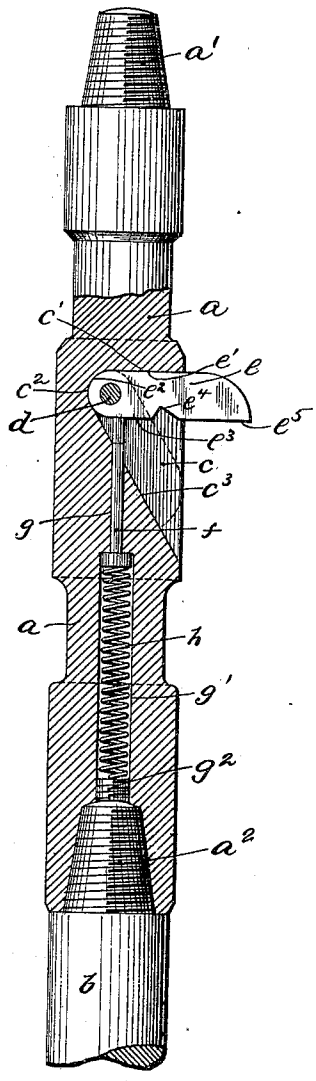



Fig. 3.

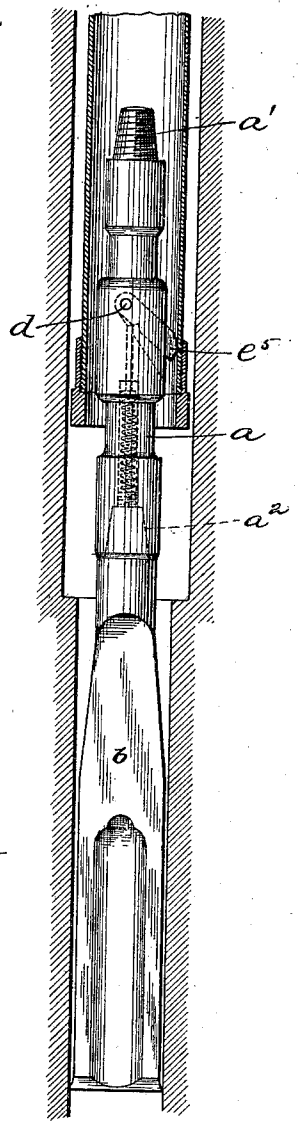



Fig. 2.

Witnesses:

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# UNITED STATES PATENT OFFICE.

WILLIAM PLOTTS, OF McDONALD, PENNSYLVANIA.

## REAMER FOR OIL OR LIKE WELLS.

SPECIFICATION forming part of Letters Patent No. 668,340, dated February 19, 1901.

Application filed May 6, 1897. Serial No. 635,351. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM PLOTTS, a resident of McDonald, in the county of Washington and State of Pennsylvania, have invented a new and useful Improvement in Reamers for Oil and Like Wells; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to reamers for oil and like wells.

The invention has reference more particularly to that class of reamers generally known as "under" reamers, in which a cutter is employed which normally projects out beyond the body of the cutter, but which when passing through the casing is withdrawn, so as not to interfere with the passage of the reamer through the same. The difficulty heretofore in the use of this class of under reamers has been the liability of the breaking or bending of the pin on which the cutter is mounted when said cutter is subjected to the severe strains which they have to bear in the cutting of the rock. If the pin breaks and the cutter is detached and becomes lodged in the well, it may prevent the further drilling of the well.

The object of my invention is to provide a reamer with the cutting-knife so secured and protected against strains as to obviate the difficulty hereinbefore referred to.

To this end my invention comprises, generally stated, a reamer having formed in the body portion thereof a seat or recess, a cutter mounted on a pin in said seat, the inner end of said cutter abutting against the solid body of the reamer at the inner face of said seat and the outer end extending normally beyond said body, (in a horizontal position,) and spring mechanism for retaining said cutter in this position.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a view of my improved reamer in use in a well. Fig. 2 is a view showing the same passing through the casing. Fig. 3 is an enlarged longitudinal section of the reamer removed from the well.

Like letters of reference indicate like parts in each view.

The letter $a$ represents the body of the reamer, having the ordinary threaded connection $a'$ at its upper end and the threaded seat $a^2$ at its lower end, with which the bit $b$ engages.

A seat or recess $c$ is formed in the body $a$ at a suitable point therein. This seat $c$ is preferably formed, as illustrated, with the straight upper face $c'$, the curved rear face $c^2$, and the inclined face $c^3$.

Mounted on the pin $d$ is the cutter $e$, said cutter having the straight upper edge $e'$, the curved rear edge $e^2$, the lower edge $e^3$, with the recess $e^4$ formed therein, and the outer cutting edge $e^5$. When the cutter $e$ is mounted on the pin $d$ and held in its normal position, the upper edge $e'$ will be in contact with the upper face $c'$ of the seat $c$, the curved rear edge $e^2$ will abut against the curved rear face $c^2$, while the cutting edge $e^5$ will extend beyond the body of the reamer.

In order to retain the cutter $e$ in its normal position for cutting, a rod $f$, movable vertically in a seat $g$ formed for it in the body $a$, has its upper end forced into contact with the lower edge $e^3$ of the cutter $e$ by means of the spring $h$. This spring $h$ fits in an enlarged portion $g'$ of the seat $g$ and presses against a head $f'$ on said rod $f$, said spring being interposed between said head $f'$ and the bottom of the seat $g'$, which consists of the plug $g^2$. By the above construction the seat $g$ is only of sufficient diameter to permit of the rod $f$ moving freely therein, so that I do not weaken the body of the reamer so much as where the spring encircles the rod and necessitates a seat of the same size as the enlarged portion $g'$ for its entire length.

The operation of my improved reamer is as follows: When the reamer is being lowered through the casing, the cutter $e$ will have its outer or cutting edge $e^5$ moving in contact with the casing, and accordingly the cutter $e$ will assume the position shown in Fig. 2. In this case the pressure brought to bear upon the cutter to lower same will also lower the rod $f$ until the lower edge $e^3$ of said cutter comes in contact with the inclined face $c^3$ of the seat $c$, whereupon the upper end of the rod $f$ will enter the recess $e^4$ in the cutter $e$. In this manner the reamer is lowered until it gets beyond the casing, as shown in Fig. 1,

whereupon the spring $h$ forces up the rod $f$ and the cutter $e$ resumes its normal position within the seat $c$. The cutter then has its cutting edge $e^5$, extending beyond the body of the reamer, in position to cut the rock below the lower end of the casing to permit of said casing being lowered. The reamer is raised and lowered in the ordinary manner of drilling, said reamer being also turned at each stroke. The cutter thus cuts under the casing in the manner illustrated.

The cutter may be used in connection with the drill-bit, as shown, or it may be used independently, if desired.

By having the cutter supported in the manner described, with its rear edge $e^2$ backed up by the solid body of the reamer, any tendency toward inward movement on the part of the cutter is resisted, so that there is practically no strain on the pin $d$. This prevents the bending or breaking of the pin $d$ and the consequent displacement of the cutter or its complete detachment from the reamer. I have found by experience that the severest strains brought upon the cutter are those lateral or horizontal strains which come from the walls of the well. Consequently by my construction the cutter is braced and backed up in such a manner as to withstand these strains without injury.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a reamer for oil and like wells, the combination with a solid body portion having a recess formed therein and a pin projecting through the rear portion of the recess, said recess adjacent to the pin being concentric therewith, of a cutter pivotally mounted on said pin and having a rear end that conforms to and closely fits the portion of the recess that is concentric with the pin, and a spring for holding said cutter normally up in a horizontal position, substantially as set forth.

2. In a reamer for oil and like wells, the combination with a solid body portion having a recess formed therein and a pin projecting through said recess, adjacent to the rear end thereof, the upper side of said recess being substantially perpendicular to the axis of the reamer-body and the rear portion being concentric with the pin, of a cutter having a rear end that closely fits the rear end of the recess, and a top edge that fits the upper side of the recess when in working position, and a spring for holding said cutter normally in a horizontal position, substantially as set forth.

3. In a reamer for oil and like wells, the combination with a solid body portion having a recess therein and a pin projecting through said recess adjacent to the rear end thereof, said rear end being concentric with the pin, of a cutter pivotally mounted on said pin and having a rear end that conforms to and closely fits the rear end of the recess, a vertically-movable rod below said cutter, and a spring adapted to force said rod into engagement with said cutter, substantially as set forth.

In testimony whereof I, the said WILLIAM PLOTTS, have hereunto set my hand.

WILLIAM PLOTTS.

Witnesses:
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