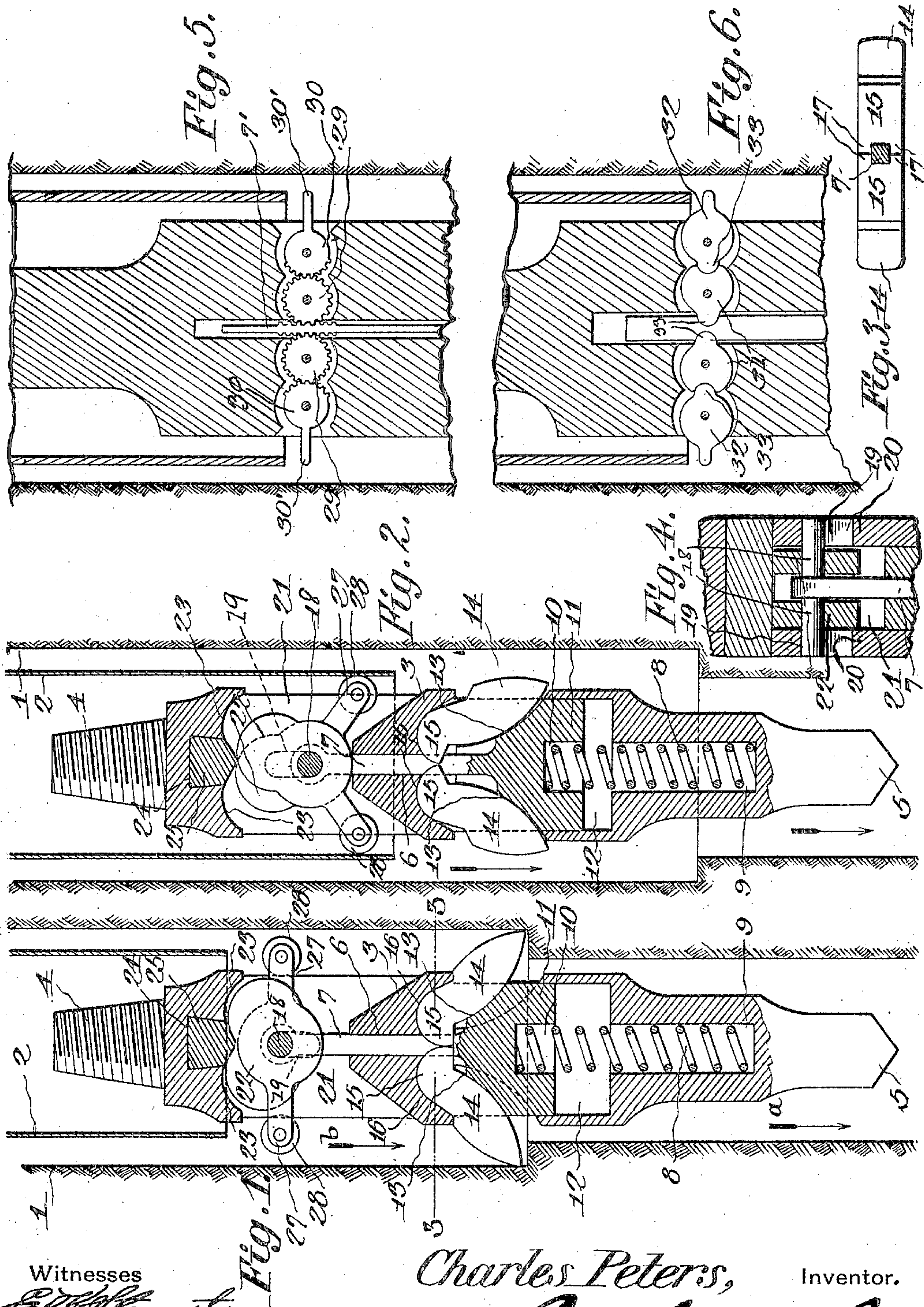


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C. PETERS.
UNDERREAMER FOR WELLS.
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Witnesses
E. J. Stewart
L. A. McKen

Charles Peters,
by *Chas. Snow & Co.*
Attorneys

Inventor.

Attorneys

UNITED STATES PATENT OFFICE.

CHARLES PETERS, OF NAMPA, IDAHO.

UNDERREAMER FOR WELLS.

No. 811,584.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES PETERS, a citizen of the United States, residing at Nampa, in the county of Canyon and State of Idaho, have invented a new and useful Underreamer for Wells, of which the following is a specification.

This invention relates to reamers for enlarging the holes of wells for the reception of the stand-pipes, and has for its objects to produce a comparatively simple inexpensive device of this character which will work beneath and enlarge the holes for the reception of the pipe and one wherein withdrawal of the tool through the pipe will initially cause the cutting members or blades to be automatically returned to retracted inactive position, thereby permitting ready removal of the reamer through the pipe.

With these and other objects in view the invention comprises the novel features of construction and combination of parts more fully hereinafter described.

In the accompanying drawings, Figure 1 is a central vertical section through the entire mechanism, showing the reamer in operation. Fig. 2 is a similar view showing the position of the parts upon the initial movement of the reamer in being withdrawn. Fig. 3 is a transverse sectional view on the plane indicated by the line 3 3 of Fig. 1. Fig. 4 is a vertical section taken at right angles to Fig. 1 and showing the manner of mounting the cams. Fig. 5 is a vertical sectional view illustrating a modified form of the invention. Fig. 6 is a similar view showing a further modification.

Referring to the drawings, 1 designates a well-hole formed in the ground by any appropriate drilling mechanism, and 2 a stand-pipe or well-tube adapted for insertion downward into said hole, which latter is initially of the diameter indicated by the arrow *a* and is adapted for enlargement by means of my improved reamer to the diameter indicated by the arrow *b*.

In the reaming device constituting the subject of the present invention 3 designates a body or head which when in active position stands vertically within the opening 1 and is provided at its upper end with a threaded nipple or shank 4 of appropriate length, the lower end of the head being reduced or pointed, as at 5, to permit ready entrance into the

ground. Arranged within the central longitudinal opening or seat 6 within the head is a vertical longitudinally-movable rod or plunger 7, adapted to be acted upon by a normally expanded actuating-spring 8, disposed within an opening or seat 9 beneath the plunger and normally tending to force the latter upwardly to active position, the spring being seated at its upper end in a recess 10, formed in the enlarged head 11 of the plunger, which head travels back and forth in a correspondingly-shaped recess 12, formed in the reduced end of the body portion, as shown.

Formed partly in the body 3 and partly in the upper face of the plunger-head is a pair of diametrically opposed recesses or seats 13, designed to receive a pair of movable cutting members or blades 14, preferably of the form shown and adapted to move in a direction transversely of the head 3 from an inactive position to an active or cutting position, these tools when in normal position being seated wholly within the recesses 13 and when in active position having their cutting ends or portions projecting from said recesses a suitable distance beyond the side walls of the head 11, as illustrated in Fig. 1. The cutting blades or members 14 are preferably provided with upper rounded portions 15, seated in correspondingly-shaped extensions 16 of the chambers 13, whereby the members are pivotally sustained within the latter, and the members further have projecting portions or lugs 17, which partially overlap the plunger-rod 7 respectively on opposite sides of the latter. The rod 7 is provided with terminal laterally-extending arms 18, which engage suitable elongated slots 19, formed in the side walls 20 of a transverse opening 21 in the body portion 3.

Disposed within the opening or chamber 21 and mounted on the arms 18 of the plunger are a pair of cams or eccentrics 22, the peripheries of which are normally seated in correspondingly-curved recesses 23, formed in the upper wall of the chamber 21, said wall being also provided with a transversely-disposed dovetailed recess 24, in which is seated a removable case-hardened bar or block 25, the point 26 of which bears against the eccentrics when the cutters are withdrawn, as will be more fully explained hereinafter. The eccentrics 22 are extended to form arms 27,

which normally extend at right angles to the longitudinal axis of the body portion and in path of the stand-pipe or well-tube 2.

In practice, supposing the hole 1 to have
5 been formed in the ground of the initial diameter indicated by the arrow *a* and that it is desired to ream or enlarge said hole to the final proportionate diameter indicated by the arrow *b* and to seat in said hole the pipe
10 2, the reaming mechanism is first inserted in the hole 1 and the pipe seated over the shank or nipple 4 of the tool. The spring 8, acting upon the bar 7, will force the latter upwardly, causing the enlarged head thereof to engage
15 the cutting members and force said members to active or cutting position. The reamer is then rotated in any suitable manner, which causes it to move downward in and enlarge the hole 1, into which the pipe 2 gradually
20 sinks. After the bottom of the hole has been reached and it is desired to withdraw the reamer the initial upward movement of the latter causes the terminal rollers 28 of the fingers or extensions to come in contact with
25 the lower end of the pipe 2, thereby causing the eccentrics to engage the bar or block and force the plunger downwardly against the action of the spring 8 and permit the cutting members to return by gravity to their retracted or inactive position, thereby permit-
30 ting the reamer to be readily withdrawn through the pipe.

By having the seating-recesses of the cutters formed partly in the plunger-head and
35 the latter movable within the recess 12 said plunger-head is always maintained in contact with the cutters, thereby preventing dirt and borings from entering said seating-recesses or cavities and obstructing, clogging,
40 or otherwise preventing the proper working of said cutters.

In Fig. 5 there is illustrated a modified form of the invention in which primary operating members or disks 29 are pivoted in
45 suitable recesses in the body portion of the tool and arranged in toothed engagement with the plunger-bar 7' and, further, in operative toothed engagement with secondary operating members or disks 30, having projecting portions or fingers 30' adapted to be engaged by the pipe.

In Fig. 6 there is illustrated a further modification in which the primary operating-disks 31 and the secondary operating-disks
55 32 are each provided with a single tooth 33, this construction being particularly designed for use on large reamers.

From the foregoing it is apparent that I produce a comparatively simple device which
60 in practice will efficiently perform its functions to the attainments of the ends in view and one in which the several parts are so constructed and assembled as to permit any of

said parts to be readily removed and replaced when worn or otherwise injured from con- 65
stant use or other causes.

Having thus described the invention, what is claimed is—

1. A boring-head having lateral extensible counterboring-cutters adapted to fold by 70
gravity, and spring-actuating means for extending the same in combination with an eccentric for repressing said spring-actuating means.

2. A boring-head having movable counterboring-cutters adapted to be folded by 75
gravity, and yielding means for extending said cutters, in combination with a reciprocatory member connected with said yielding means for repressing the same, and an eccentric 80
carried by the head and provided with laterally-projecting trips for contact with the lower end of a pipe-section, said eccentric being operatively connected with the reciprocatory member. 85

3. A boring-head having spring-actuated counterboring-cutters in combination with cutter-folding devices consisting of a reciprocatory member, and an eccentric having laterally-yieldable arms for contact with the 90
lower end of a pipe-section, and adapted to impart motion to the reciprocatory member.

4. A boring-head having yielding counterboring-cutters disposed for contact at their inner ends, yielding means for holding said 95
cutters extended, and an eccentric for moving said cutters to inoperative position.

5. A boring-head having movable counterboring-cutters housed therein, a plunger mounted to follow said cutters, and an eccentric 100
operatively connected with said plunger for actuating the cutters.

6. A boring-head having recesses formed therein, movable counterboring-cutters housed in said recesses, a plunger disposed to 105
follow said cutters and exclude borings from said recesses when the cutters are extended, and an eccentric operatively connected with said plunger for actuating the cutters.

7. A boring-head having movable counterboring-cutters housed therein, a spring-pressed plunger mounted for reciprocatory movement in the head and operatively connected to said cutters, and an eccentric carried by the plunger for depressing the latter 110
and moving the cutters to operative position. 115

8. A boring-head having counterboring-cutters housed therein, a spring-actuated plunger having recesses formed therein to receive said cutters, and an eccentric for depressing the said plunger and moving the cutters to operative position. 120

9. A boring-head provided with opposite communicating recesses and an axial cavity, counterboring-cutters mounted respectively 125
in said recesses for outward swinging move-

ment at their lower ends and adapted to be
housed by gravity, the inner ends of said cut-
ters being in contact, a spring-actuated plun-
ger mounted in said cavity, and an eccentric
5 operatively connected with said plunger for
actuating the cutters.

In testimony that I claim the foregoing as

my own I have hereto affixed my signature in
the presence of two witnesses.

CHAS. PETERS.

Witnesses:

WM. STRODE,

FRED. G. MOCK.