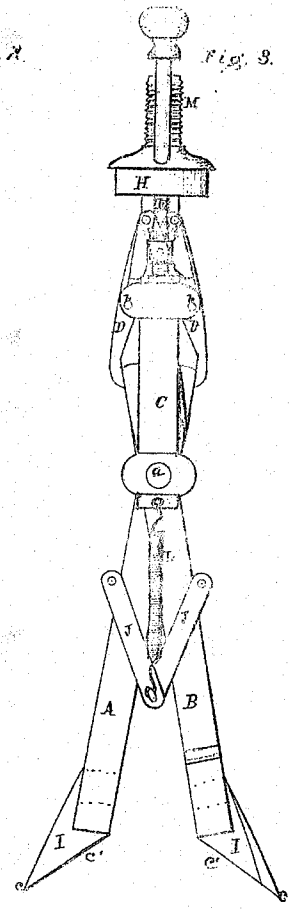
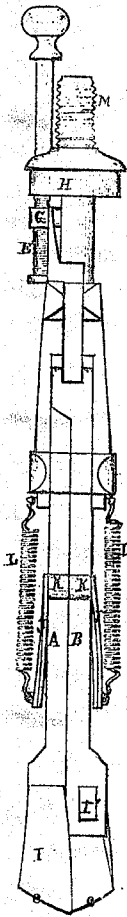
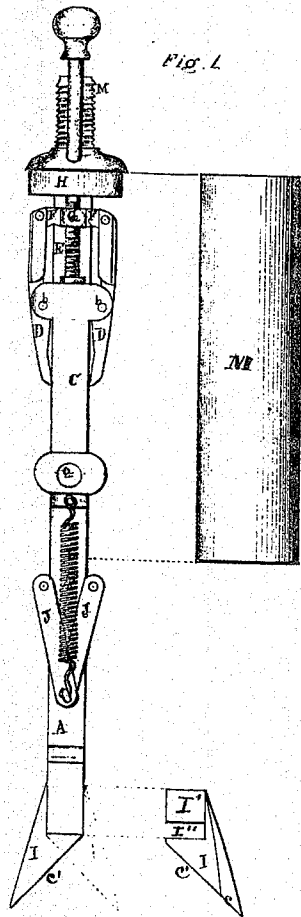


*Rigg, Hall & Fenton,*

*Oil Well Reamer.*

*No. 104,649*

*Patented June 21, 1870.*



*Inventors*  
*John Rigg*  
*A. C. Hall*  
*C. F. Fenton*  
*per Burridge & Co*

*Witnesses*  
*J. H. Burridge*  
*W. S. Humphrey*

# United States Patent Office.

JOHN RIGG, JOSHUA E. HALL, AND CARNOT F. FENTON, OF CLEVELAND,  
OHIO.

Letters Patent No. 104,649, dated June 21, 1870.

## IMPROVEMENT IN OIL-WELL REAMERS.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that we, JOHN RIGG, JOSHUA E. HALL, and CARNOT F. FENTON, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and improved Oil-well Reamer; and we do hereby declare that the following is a full, clear, and complete description of the same, reference being had to the accompanying drawing making part of this specification, in which drawing—

Figures 1 and 2 are side views of the reamer, with the cutters closed.

Figure 3 is a view of the reamer, with the cutters expanded.

Like letters of reference refer to like parts in the several views.

### Objective.

This invention relates to an apparatus for enlarging the diameter of oil-wells, beginning at any required distance below the mouth of the well, and extending the enlargement downward to any desirable depth.

Said apparatus consists of a pair of cutters secured to the extreme ends of a pair of pivoted legs, the upper ends of which are so operated by certain levers actuated by a screw that the said arms and cutters may be expanded more or less, as hereinafter described.

### Descriptive.

In fig. 3—

A B represent a pair of legs, the upper ends of which are pivoted between the cheeks of the stay C, at the point *a*.

D is a pair of levers pivoted in the upper end of the stay, at the points *b*, the lower ends of which descend below the upper ends of the legs, and rest against them, as shown in the drawing.

The upper ends of the levers D are connected to a screw, E, by means of the links F, one end of which being pivoted to the end of the levers D, whereas the opposite end is pivoted to a nut, G, fig. 2, in which the screw works, as and for a purpose presently shown.

To each of the lower ends of the legs A B is secured the cutters I, projecting downward at an angle from the side of the leg, and provided with a slanting sharp cutting-edge, *c*, fig. 2. A detached view of such cutter is shown in fig. 1. These cutters are constructed with the cutting-edge *c* upon a curve, and with the back face *c'* inclined at an angle to the axis of rotation.

Extending from the cutter is lug I', with a space, I'', adjoining. The lugs I' of the cutters fit into a mortise of the legs A B, at or about right angles thereto, and that portion of the said legs below the mortise fits into the space I'' of the cutters. The ob-

ject of this form of cutter and mode of attachment is to prevent clogging and to secure the cutters in place by the lateral pressure in working the reamer, and at the same time a ready and easy mode of adjusting the cutters.

J, figs. 1 and 3, is a pair of links, the lower ends of which are pivoted to each other, whereas their upper ends are pivoted each to one side of a leg by means of a lug, K, projecting therefrom.

L is a spring connecting the lower ends of the links to the lower end of the stay C above referred to. One pair of such arms and spring are attached to each side of the legs, as shown in fig. 2.

### Operation.

As above said, this apparatus is for enlarging the size of oil-wells, or other wells of an artesian class, at any required depth below the mouth of such wells, thereby saving the time, expense, and labor of enlarging the entire bore for the purpose of increasing a certain required distance of the lower end only.

Into the well to be enlarged the reamer is lowered to the required depth at which the enlargement is to commence, by attaching it to rods of the proper length, by means of the screw M. At this descent of the apparatus the legs are closed, as shown in fig. 1. This closing together of the legs is effected by the screw E, which, on being turned in the proper direction, will bring the nut G to the position shown in fig. 1, in which it will be seen that the links F are in a horizontal position, thereby throwing outwardly the upper arms of the levers D, and inwardly the lower arms thereof, against the upper ends of the legs A B, the result of which is the closing together of the lower ends of the legs and cutters, as shown in figs. 1 and 2.

In this contracted state of the apparatus it is easily lowered into the well to the desired point at which to commence the enlargement. This point being reached, the cutters are expanded by distending the legs, which, as will be obvious, is done by reversing the action of the screw E, thereby allowing an outward movement of the lower ends of the levers D, releasing their pressure upon the legs, which will now be thrown apart by the tension of the springs L. Said tension is obtained by the closing together of the legs, in consequence of the compression of the levers against their upper ends, which, on being released therefrom, the spring contracts, thereby drawing upward upon the links, and causing a distension of the legs, as aforesaid.

It will be obvious that by this means the cutters can be expanded to a more or less degree, according to the thickness of the chip to be worked off the sides of the well.

The working of this reamer is like that ordinarily practiced in boring with a drill, and the same mechanism employed for giving the reciprocating vertical action to the drill can be as readily applied to the reamer, the reaming being effected by the cutting down the sides of the bore by a succession of strokes, chipping off from the sides of the well chips of more or less thickness, according to the set of the reamer.

It will be obvious that on working the reamer its movement upward will be free, in consequence of the ability of the cutters to close together, should they impinge upon the sides of the well or any obstruction that may be therein, whereas on its descent the sharp angular cutters will tend to draw into the sides of the well by the outward expansion of the legs and the peculiar basal angle of the cutter, and will, therefore, not close by the downward stroke, but, on the contrary, cut into the sides of the well to the extent of the set of the reamer.

One course of cutting having been done to the length downward required, the reamer is drawn up to the starting point, and the cutter is set out for a second downward cutting, as before, the adjusting-screw being operated by a rod reaching to the top or mouth of the well.

By this means the sides of the well may be cut away to any desirable extent, and to any distance downward, without enlarging the entire bore from its mouth down to where the enlargement is required to be made.

In order to protect the screw-levers, &c., from injury and dirt while in active operation, a shield, M, fig. 1, is placed on over the reamer, thereby inclosing such parts thereof included in the dotted lines.

#### Claims.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The levers D D, as arranged in combination with the adjusting-screw E and legs A B, in the manner as and for the purpose set forth.

2. The cutters I, constructed as described and arranged, in combination with the pivoted legs A B and links J, operating conjointly as and for the purposes substantially as set forth.

3. The arrangement of the links F F, nut G, with its screw E, pivoted levers D, in combination with the pivoted legs A B, links J, and springs L, operating conjointly as and for the purpose substantially as described.

4. The combination of the reamer and shield M, substantially as and for the purpose specified.

JOHN RIGG,  
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C. F. FENTON.

Witnesses:

J. H. BURRIDGE,  
D. L. HUMPHREY.