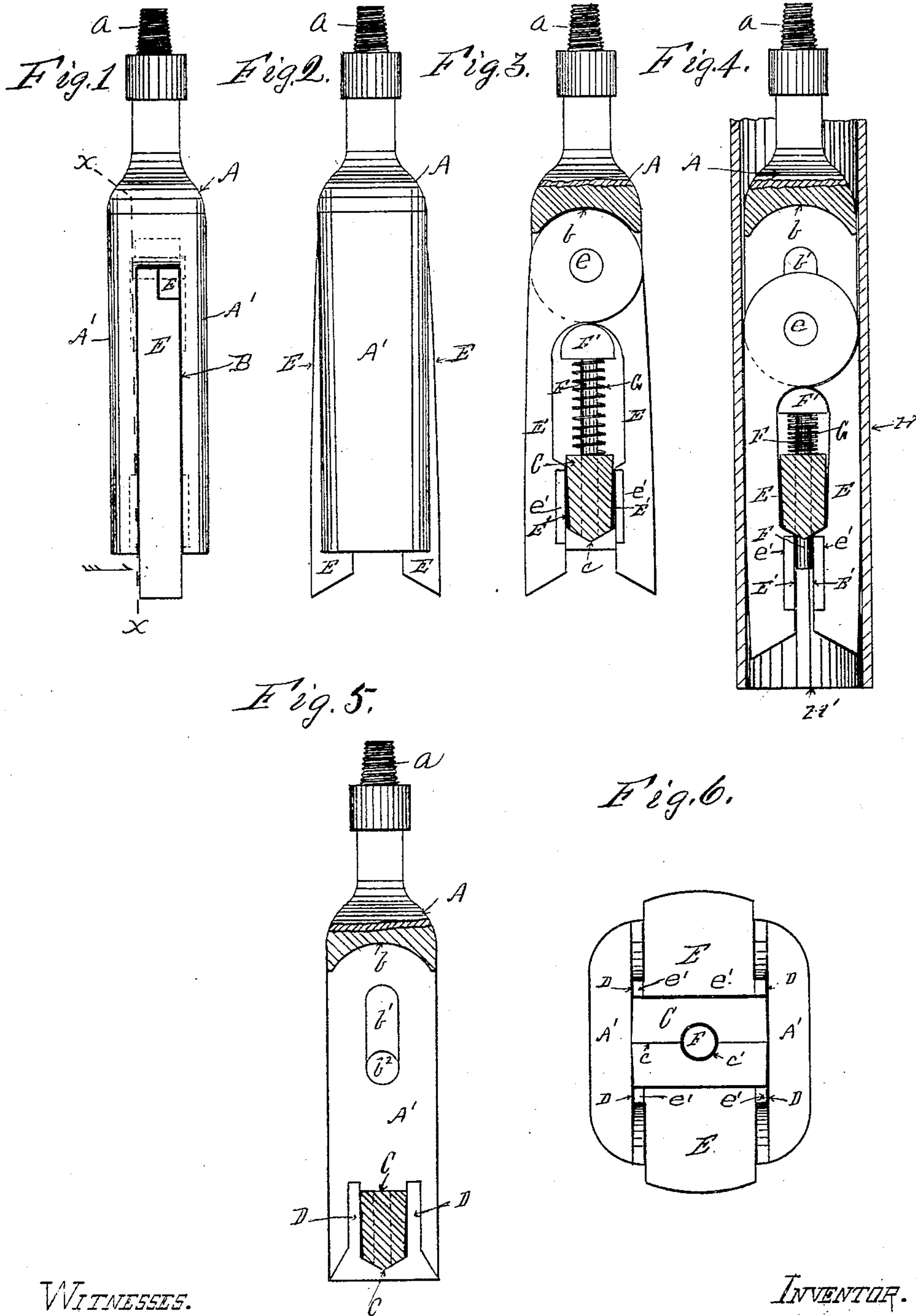


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EXPANDING REAMER FOR OIL OR ARTESIAN WELLS.

(Application filed Feb. 20, 1902.)

(No Model.)



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EXPANDING REAMER FOR OIL OR ARTESIAN WELLS.

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Application filed February 20, 1902. Serial No. 94,980. (No model.)

To all whom it may concern:

Be it known that I, JONAS P. SMITH, a citizen of the United States, residing at Peru, in the county of Miami and State of Indiana, have invented certain new and useful Improvements in Expanding Reamers for Oil or Artesian Wells; and I do hereby 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 of reference marked thereon, forming part of this specification.

My invention relates to expanding reamers for boring oil and other Artesian wells, and has for its object the production of an expanding reamer of simple and substantial construction adapted to be attached to the drilling-tools and put down through the casing of the well, which will expand when it passes below the casing, so as to make a hole larger than the casing, and which can readily be withdrawn through the casing. I accomplish this object by constructing a reamer-body with a longitudinal slot or opening, in which I place two cutter-jaws which are hinged together at their upper ends and adapted to move up and down in said slot or opening, and as they move upward the lower ends of the jaws are moved apart and as they move downward the lower ends of the jaws close together. These and other features of this invention are hereinafter set forth and explained, and illustrated in the accompanying drawings, in which—

Figure 1 is an edgewise view in elevation of my improved expanding reamer. Fig. 2 is a side elevation of the same. Fig. 3 is a sectional view of the same with the side thereof broken away on the line $x x$ in Fig. 1, showing the cutter-jaws up. Fig. 4 is a like sectional view of the reamer shown as passing downward or upward in a well-casing with the cutter-jaws moved downward and closed together. Fig. 5 shows a sectional view of the reamer-body on the line $x x$ in Fig. 1 with the cutter-jaws removed. Fig. 6 shows the lower end of the reamer with the cutter-jaws expanded.

In the drawings illustrating my invention,

A is the body of the expanding reamer, provided with a screw-threaded pin a of the usual construction, by means of which it can be secured to the drilling-tools. (Not shown.) In this body A, I make a transverse slot or opening B, the upper end b of which is circular, and connecting the sides $A' A'$ of this opening B at the lower ends there is a connecting-block C, which tapers slightly from its upper end downward and terminates in an obtuse wedge-shaped lower end c , and at each side of the block C there are grooves D D, and on the inner faces of the upper part of the sides $A' A'$ are vertical depressions $b' b'$, and through one of the sides A' at the lower end of the depression b' therein there is an opening b^2 , which may be closed by a small screw-plug, if desired. In the opening B in the body A, I place a pair of cutter-jaws E E, pivoted together at their upper ends by means of a pivot e , which extends sidewise into the recess $b' b'$ in the sides $A' A'$ of the slot or opening B and operates as a guide upon which the hinged upper ends of the jaws E E move. The upper end of the hinged-jaw joint is made circular, so that when the jaws are up it rests or seats in the curved portion b of the slot or opening B, as clearly shown in Fig. 3. The lower portion of the insides of the jaws E E are provided with bearing-surfaces $E' E'$, adapted to contact with the sides of the block C when the jaws E E are up in the position shown in Figs. 1, 2, and 3, and at this point there are also beads or guides e' on each side of the jaws E E, adapted to fit the recesses or grooves D D in the sides $A' A'$ of the frame at each side of the block C, which when the jaws E E are up, as in Figs. 1, 2, and 3, prevent the lower ends thereof from moving outward.

For automatically raising the jaws E E to the position shown in Fig. 3, ready for operation, I provide a vertically-sliding rod F, the lower end of which operates in an opening c' in the block C and freely slides up and down therein. The upper end of this rod F is provided with a semicircular head F' , adapted to engage the under surface of the hinged joint joining the upper ends of the jaws E E, as illustrated in Figs. 3 and 4, and upon the rod F, between the head F' thereof and the upper end of the block C, I place a strong spiral

spring G, which operates upon the cutter-jaws E E to normally retain them in an upraised position, with the joint connecting them firmly seated in the curved portion *b* of the slot or opening B, as illustrated in Fig. 3.

In operation the pin *a* on the body A of the reamer is firmly screwed to the drilling-tool stem. (Not shown.) The jaws E E are then moved downward in the slot or opening B in the body A, which moves the rod F downward, compressing the spring G until the bearing-faces E' E' on the jaws E E pass below the lower end of the block C, so that the lower ends of the jaws E E close together, as illustrated in Fig. 4. The reamer will then pass down the well-casing H, as illustrated in Fig. 4, and when the reamer passes down out of the lower end H' of the casing H the spring G, acting upon the rod F, forces the jaws E E up, so that the bearing-surfaces E' E' thereon contact with the sides of the block C, which throws the lower ends of the jaws outward, where they are firmly held, their outward movement being limited by the guides *e'* engaging the grooves D in the body A. In case the jaws wedge into and stick in the hole the tapering sides of the block C as it is raised allow them to move inward slightly, which operates to relieve them. When it is desired to withdraw the reamer from the well, it is drawn up until the edges of the expanded jaws E E contact with the lower end H' of the casing. If the body A is then moved upward, the jaws E E will remain stationary until the bearings E' E' thereon are below the block C in the body A, when they will move toward each other, so that the entire structure will move upward within the casing H.

I have thus shown and described a convenient construction of my invention, so as to enable others skilled in the art to construct and utilize the same; but I do not desire to confine myself to the exact construction herein shown and described, as many parts thereof may be modified without departing from the spirit of my invention.

Therefore what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination in an expanding reamer for boring oil-wells or other Artesian wells, of a reamer-body having a slot or opening there-

in, a pair of cutter-jaws pivoted together at their upper ends and so mounted in said slot or opening as to move up and down therein, a block connecting the central part of the sides of the body together in the lower portion of said slot or opening, bearings on the jaws adapted to contact with said block when the jaws are raised in said slot, and means for retaining the jaws in a normally upraised position, substantially as and for the purpose set forth.

2. The combination in an expanding reamer for boring out oil or other Artesian wells, of a reamer-body having a vertical slot or opening therein, a tapering block connecting the central portion of the sides of the body together at the lower end of the slot, a pair of cutter-jaws pivoted together at their upper ends and arranged to slide vertically in said slot or opening, so that their lower portions extend down past each side of said central block, grooves in the body at each side of said block, ribs or guides on the jaws operating in said grooves, and spring-actuated mechanism operating to raise the jaws in the body, substantially as and for the purpose set forth.

3. The combination in an expanding reamer for boring oil or other Artesian wells, of a reamer-body A provided with a screw-threaded pin *a*, and having a slot or opening B therein with its upper end *b* circular, and depressions or grooves *b'* and D D in the inside faces of said slot or opening, a tapering block C connecting the sides A' A' of the body A between the depressions or grooves D D, a pair of jaws E E pivoted together at their upper ends by means of a pin *e*, and having their joint circular so as to fit against the surface *b*, bearing-surfaces E' E' on the lower portions of the jaws adapted to fit against the sides of the block C, and ribs *e'* *e'* thereon adapted to fit into the grooves D D, and a spring-actuated rod F adapted to raise the jaws in the slot or opening B in the reamer-body, substantially as and for the purpose set forth.

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

JONAS P. SMITH.

Witnesses:

JOSEPH CALLANTIRE,
WARREN J. BUTLER.