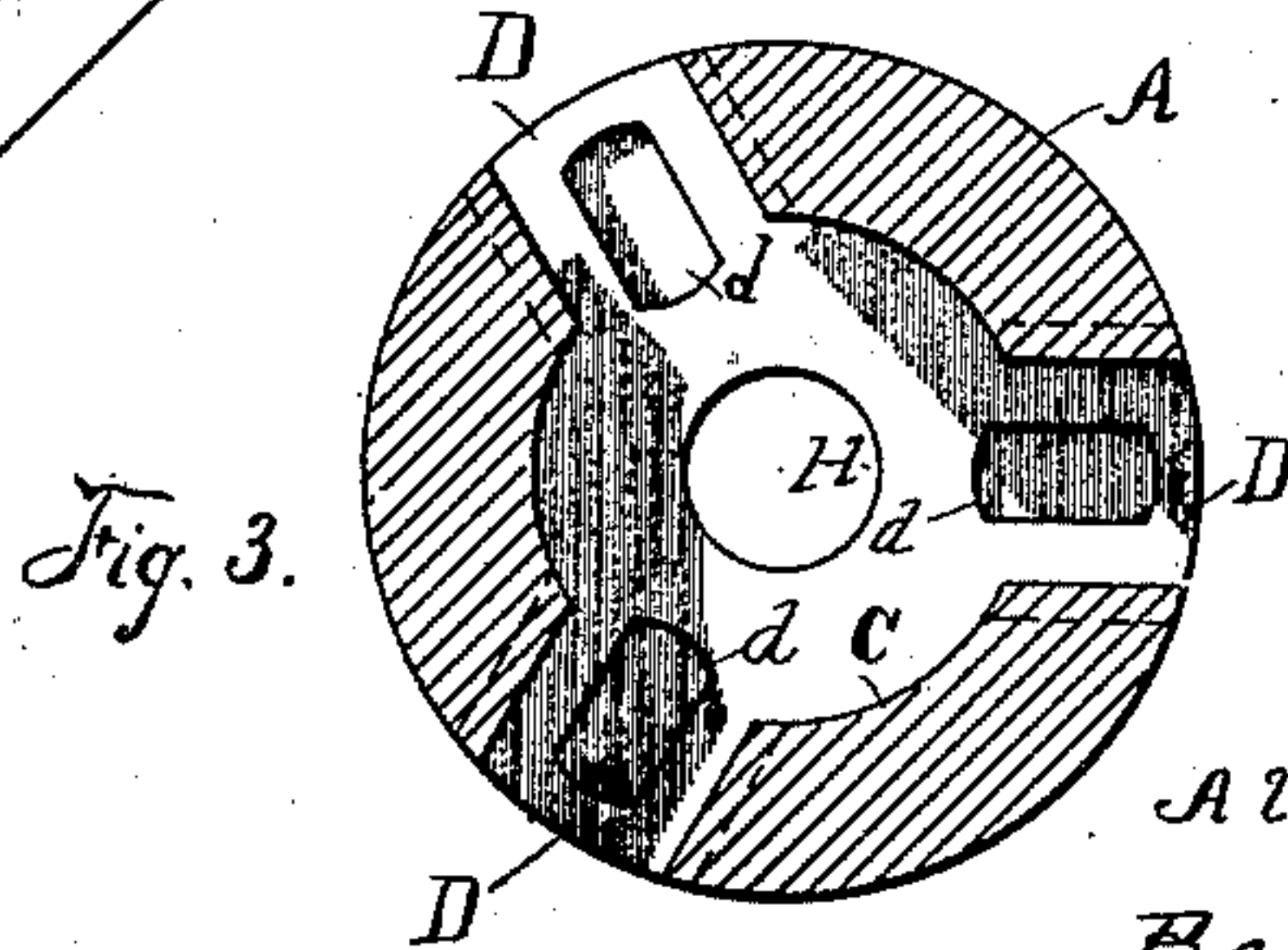
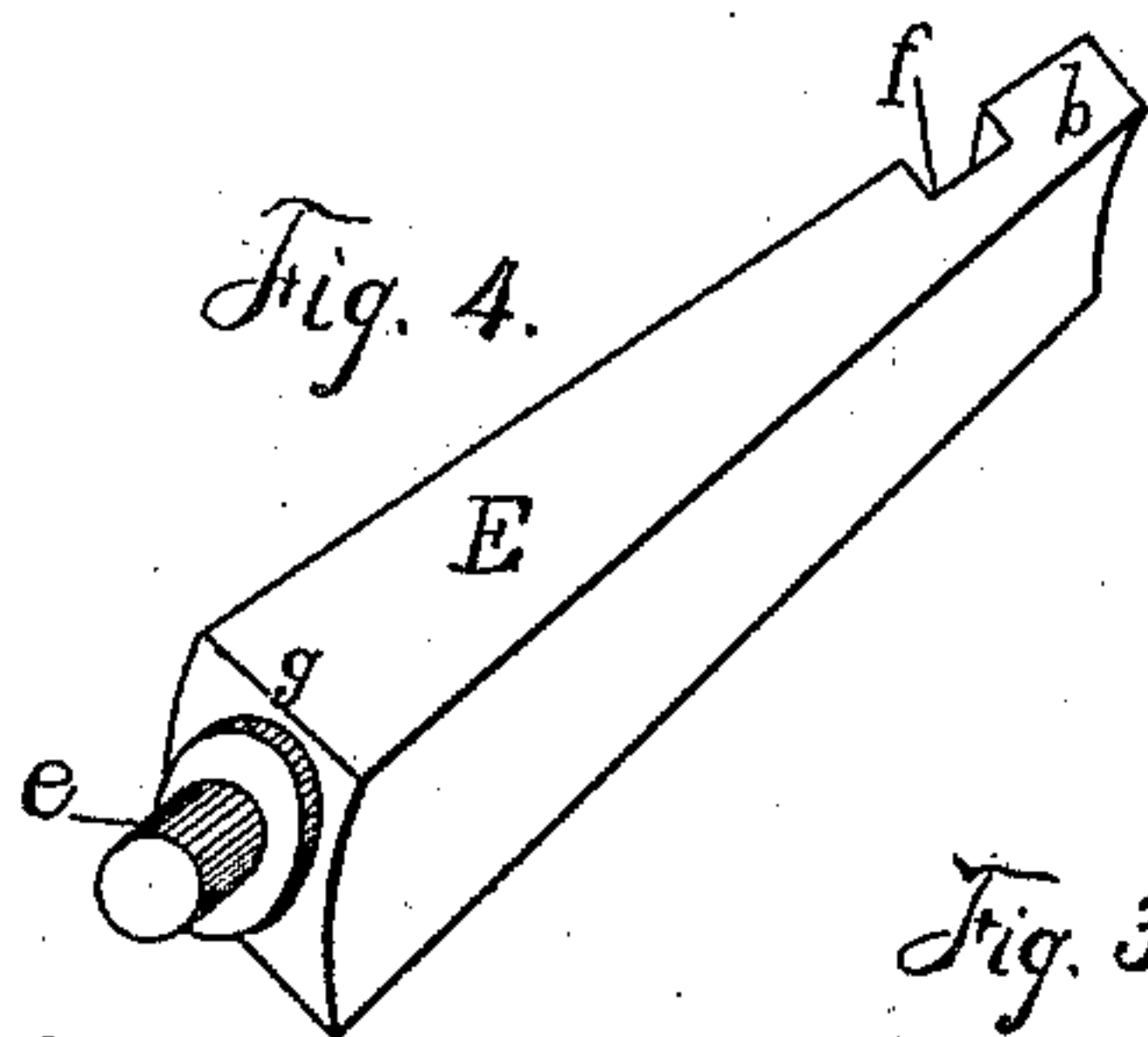
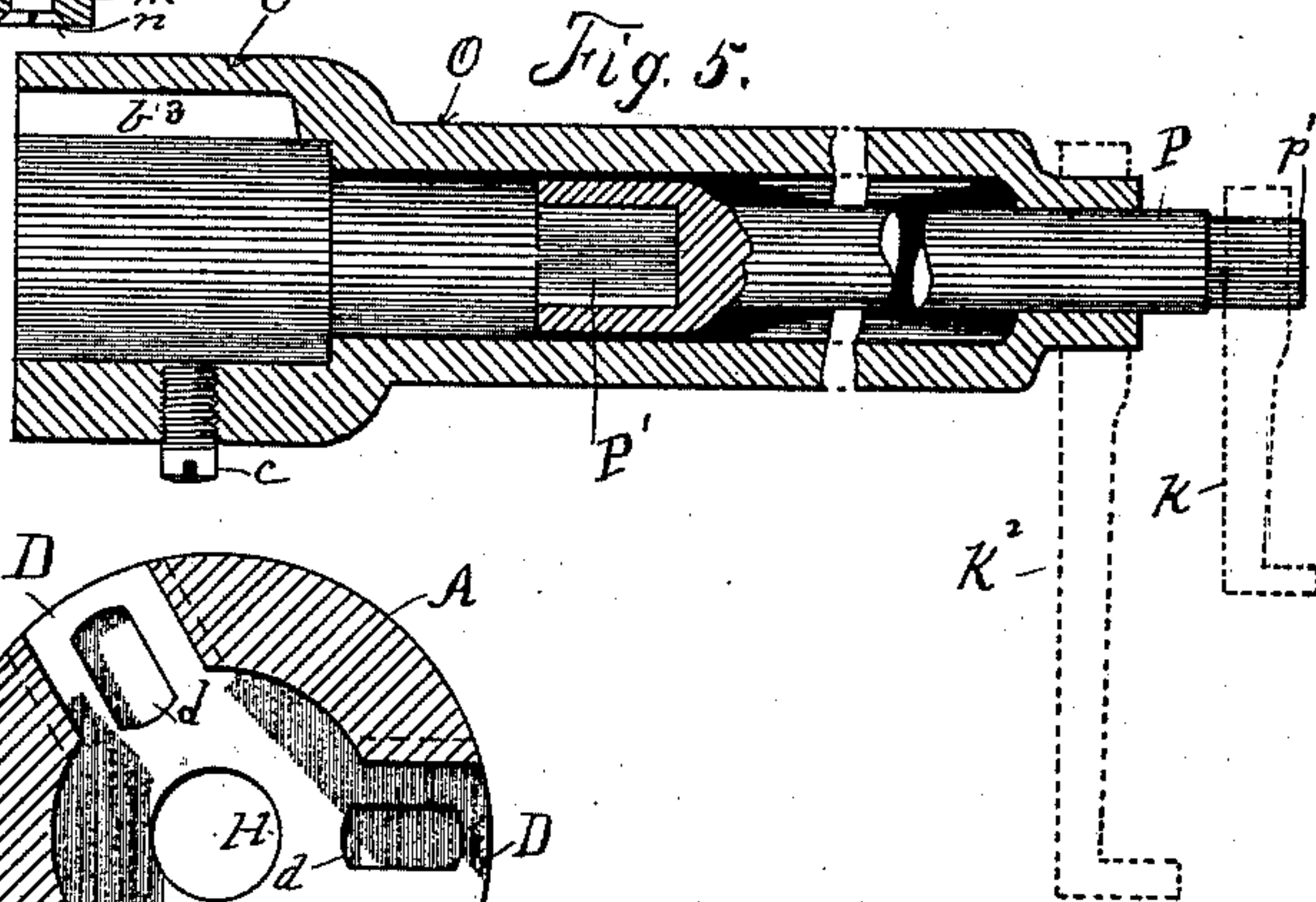
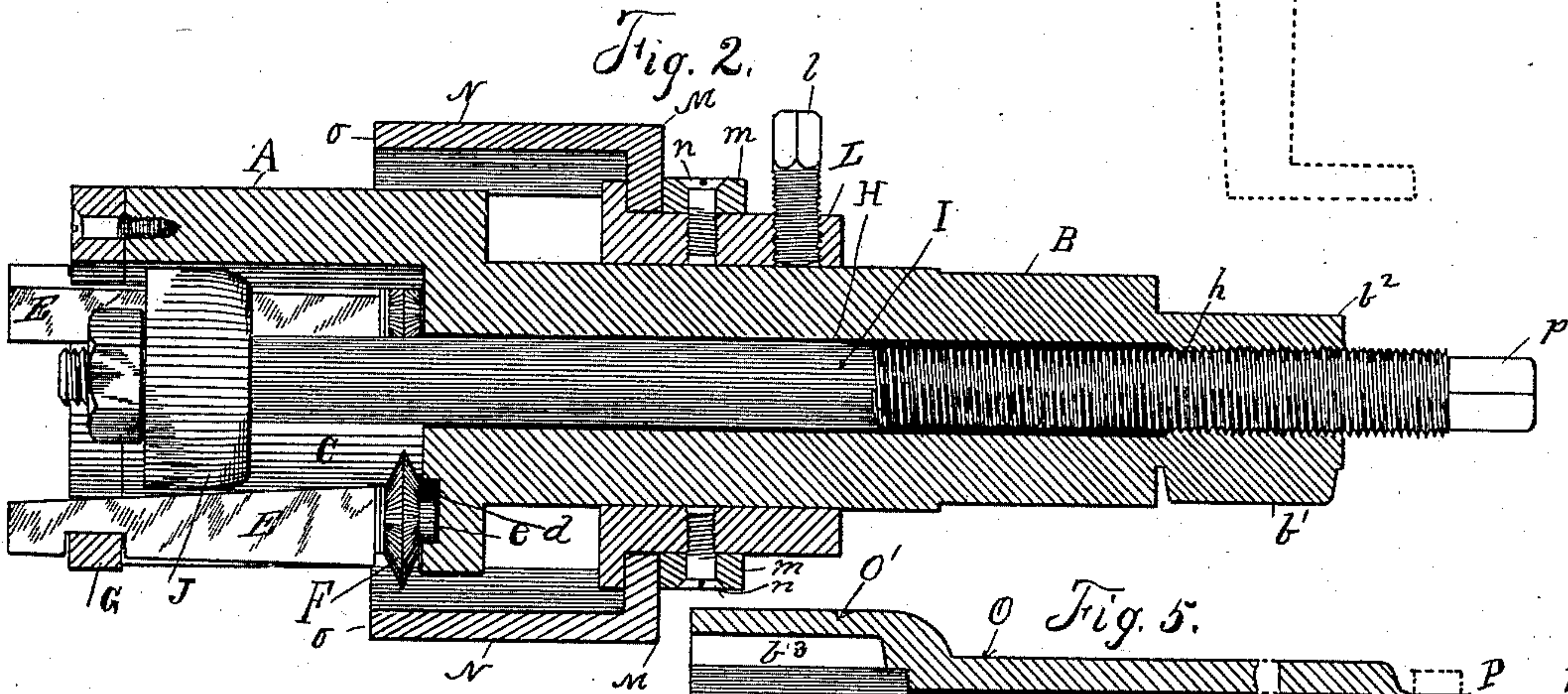
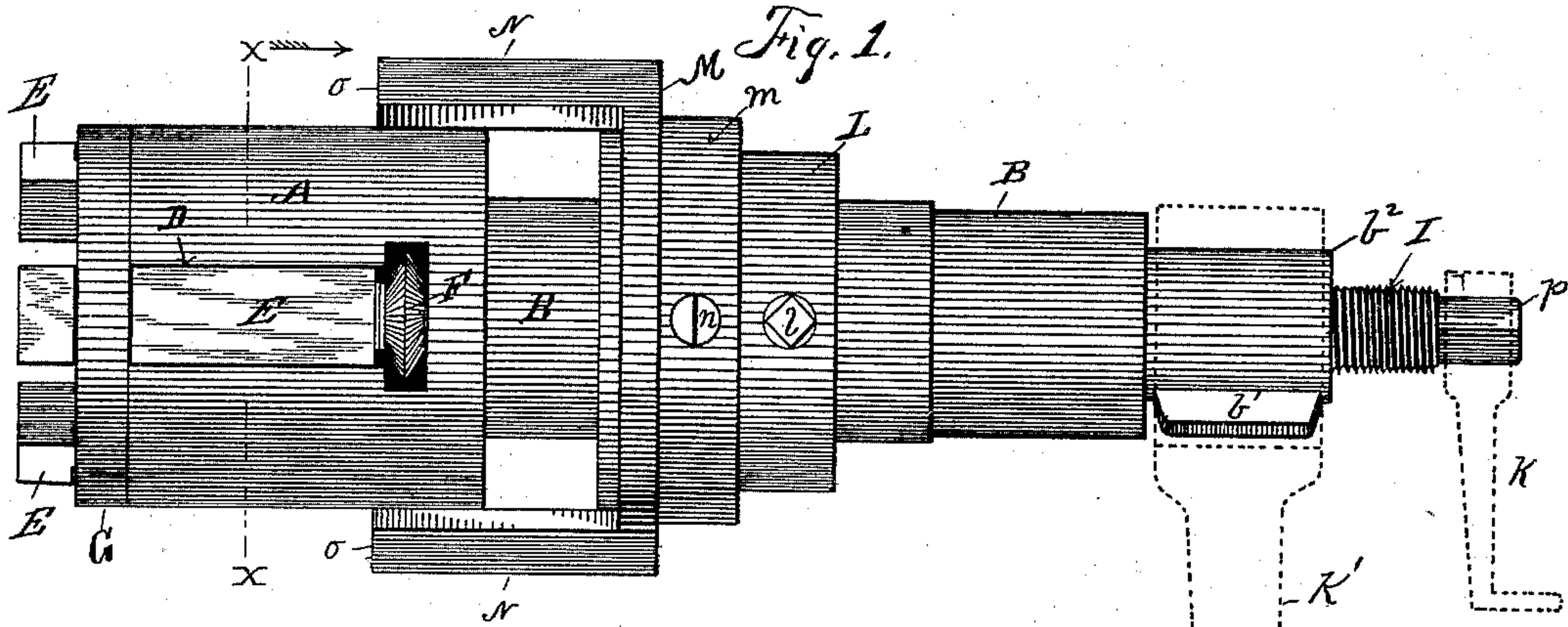


(No Model.)

A. C. FORBES.
TUBE CUTTER.

No. 474,823.

Patented May 17, 1892.



Witnesses.
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F. J. Barnett

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UNITED STATES PATENT OFFICE.

ALEXANDER C. FORBES, OF CORRY, PENNSYLVANIA, ASSIGNOR OF THREE-SEVENTHS TO GEORGE T. HANNING, OF NEW YORK, N. Y.

TUBE-CUTTER.

SPECIFICATION forming part of Letters Patent No. 474,823, dated May 17, 1892.

Application filed March 23, 1889. Renewed June 6, 1890. Serial No. 354,496. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER C. FORBES, a citizen of the United States, residing at Corry, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Tube-Cutters; 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 consists in the improvements in tube-cutters hereinafter set forth and explained, and illustrated in the accompanying drawings, in which—

Figure 1 is a view in elevation of my improved tube-cutter. Fig. 2 is a central longitudinal section of same. Fig. 3 is a cross-section of the body of the tube-cutter on the line $x x$ in Fig. 1, looking in the direction of the arrow. Fig. 4 is a perspective view of one of the levers on which the rotary cutters are mounted, detached from the machine. Fig. 5 is a central longitudinal section of an extension attachment to my tube-cutter.

Like letters refer to like parts in all of the figures.

In the construction of my invention shown, A is the head of the expander-body, and B the stem thereof. In the body A a chamber C is bored out. In the shell surrounding the chamber C are cut three slots D D D, equidistant from each other. At the inner ends of the slots D are cut radially-slotted bearings d . In the slots D are placed levers E, these levers being at their outer ends b about the same or of less thickness than the shell of the chamber C, from which point to near the inner ends g thereof they gradually increase in thickness, so that the ends g are of about twice the thickness of the ends b . These levers E have journals e on the inner ends g thereof, adapted to receive the rotary cutters F, and also to project beyond the cutters F into the slots d . Near the outer ends of the levers E, I cut annular grooves f , into which an annular ring G, secured to the outer end of the body A, fits when the levers E are in place in the slots D, so as to prevent any

longitudinal movement of the bars E in the slots D. Through the stem B of the body A, I bore a longitudinal opening H, opening centrally into the inner end of the chamber C in the head A. In a portion of this opening H, I cut a screw-thread h . In the opening H, I insert a rod I, which is partially screw-threaded, so as to engage with the screw-thread h in the stem B. To the end of the rod I, which extends into the chamber C, I secure a collar J of such size as will fit loosely in the chamber C, so that when it is at the outer end of the chamber C the levers E will close into the slots D, so that the rotary cutters F on the inner ends thereof will be below the outside surface of the body A; but when the collar J is moved toward the inner end of the chamber C it acts upon the inclined inner surfaces of the levers E (the outer ends thereof being held by the ring G) and serves to force their inner ends and the rotary cutters F, mounted thereon, outward. The collar J is moved inward or outward in the chamber C by rotating the rod I by means of a crank K, (shown in dotted lines,) applied to the squared outer end of the rod I, the screw-thread on said rod I engaging with the screw-thread h in the stem B and causing the rod I to travel in or out, according to the direction in which it is rotated. On the stem B is an adjustable collar L, adapted to slide longitudinally thereon and be secured at any desired point by means of a set-screw l . Upon the collar L is mounted a rotating ring M, secured in place by a collar m , fastened to the collar L by means of screws $n n$. This ring M is provided with lips or flanges N N, which extend toward and over the head A at a sufficient distance radially therefrom, so that when the head A is inserted into the end of a tube the flanges N N will pass over the outside of the end of the tube, so that when a tube projects through a boiler-head the collar L, carrying the ring M, can be so adjusted upon the stem B as to cut the tube off at any point desired with relation to the head of the boiler in which the tube is situated.

In Fig. 5 I show an extension device consisting of a hollow stem O, of any desired length, provided with a grooved socket O' at one end adapted to be secured by means of a

set-screw *c* upon the end *b* of the stem *B* of the tube-cutter, while the opposite end thereof is provided with a squared end suitable to receive a crank *K*². Through the opening in the hollow stem *O* is a rod *P*, provided with a socket *P'* on its inner end adapted to fit the square end *p* of the rod *I* in the stem *B*, the outer end of the rod *P'* being squared to receive a crank *K* for turning the same.

10 In operation the collar *J* is moved toward the outer end of the cutter-head *A* by means of the rod *I* until it occupies the position shown in Fig. 2. This allows the levers *E* and rotary cutters *F*, mounted thereon, to move

15 inward until the cutters *F* are even with or below the periphery of the cutter-head *A*. The head *A* is then inserted into the end of a tube to be cut until the cutters *F* are opposite the point at which it is desired of cutting off the tube. The collar *L* is then moved forward until the ends *o o* of the flanges *N N* contact with the outside of the boiler-head, when the collar *L* is secured to the stem *B* by means of the set-screw *l*. The crank *K* is then

25 turned until the cutters *F* are moved out into contact with the inner surface of the tube, when the body *A* and stem *B* of the cutter is rotated by means of a crank *K'*, the crank *K* being meanwhile turned sufficiently to force the cutters *F* outward until the tube is severed. In case the cutter has to be used in a locomotive smoke-box or under like conditions the cranks *K'* and *K* are then removed and an extension device, as shown in Fig. 5,

35 (of suitable length,) is secured to the outer end of the stem *B* and cranks *K* and *K*² secured to the outer end thereof, when the device is operated, as hereinbefore described.

Having thus fully described my invention,

so as to enable others to construct and use the same, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination, in a tube-cutter, of a centrally-chambered and radially-slotted cutter-head, wedge-shaped levers mounted in the slots in said head, so that one end of each of said levers can be moved radially, and rotary cutters mounted on bearings on the movable ends of said levers, with a longitudinally-moving screw-actuated collar in the central chamber of said head between said wedge-shaped levers, adapted when moved longitudinally to force the free ends of said radially-moving levers and the rotating cutters thereon outward, substantially as and for the purpose set forth.

2. The combination, in a tube-cutter, of a longitudinally-slotted head *A*, having a longitudinal chamber *C* therein and a hollow stem *B*, and the levers *E*, secured at their outer ends in the slots *D* by a ring *G* and having rotary cutters *F* mounted on bearings *E* on their inner ends, with a collar *J* in the chamber *C*, secured to a screw-threaded rod *I*, extending through the opening in the stem *B* and engaging with a screw therein, whereby the collar *J* may be moved longitudinally in said chamber, substantially as and for the purpose set forth.

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

ALEXANDER C. FORBES.

Witnesses:

GEO. A. NANTES,
A. F. BOLE,
M. H. STEWART.