

No. 629,080.

Patented July 18, 1899.

J. KEENAN.
BOILER TUBE CLEANER.

(Application filed Jan. 18, 1899.)

2 Sheets—Sheet 1.

(No Model.)

Fig. 2

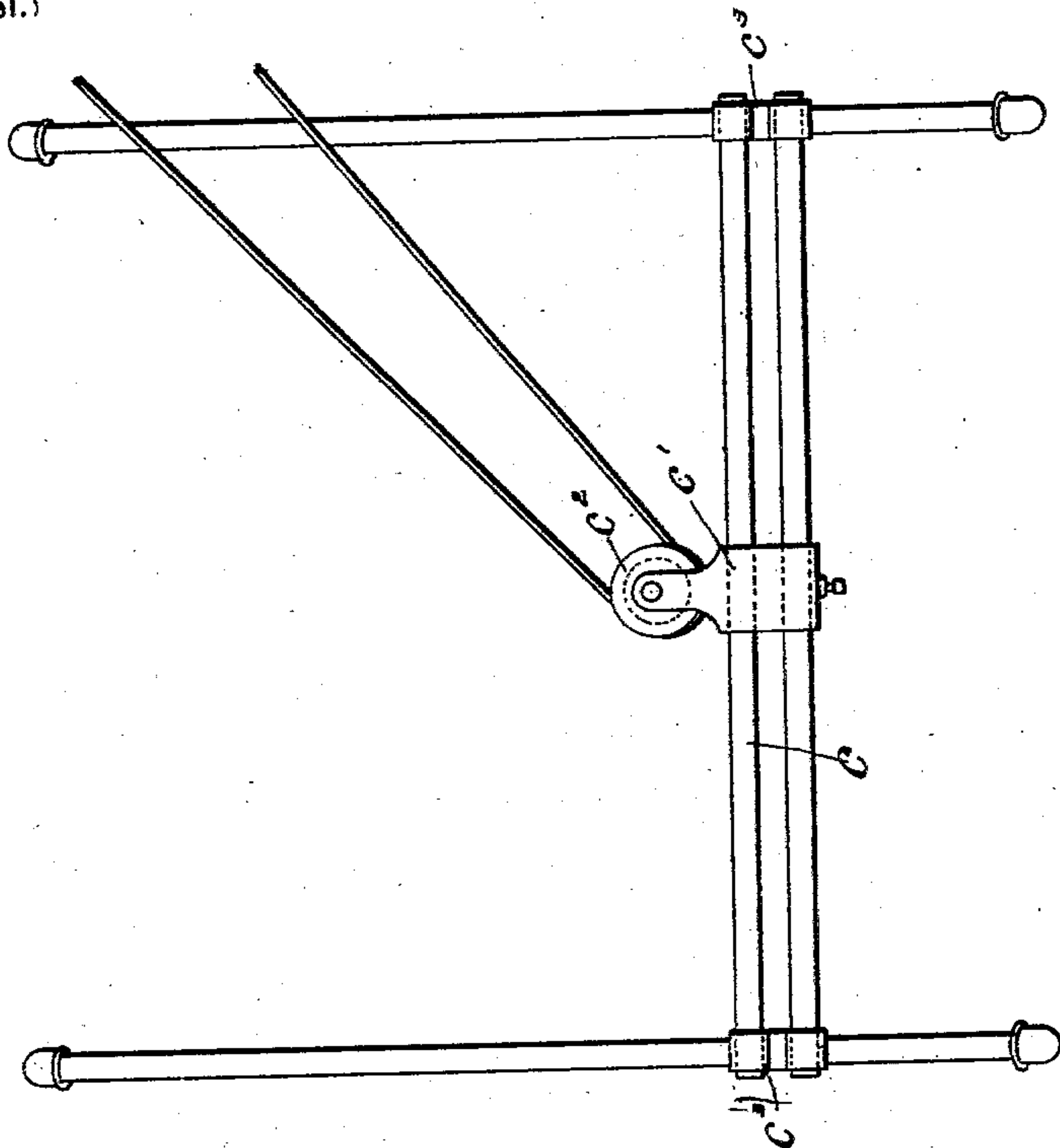
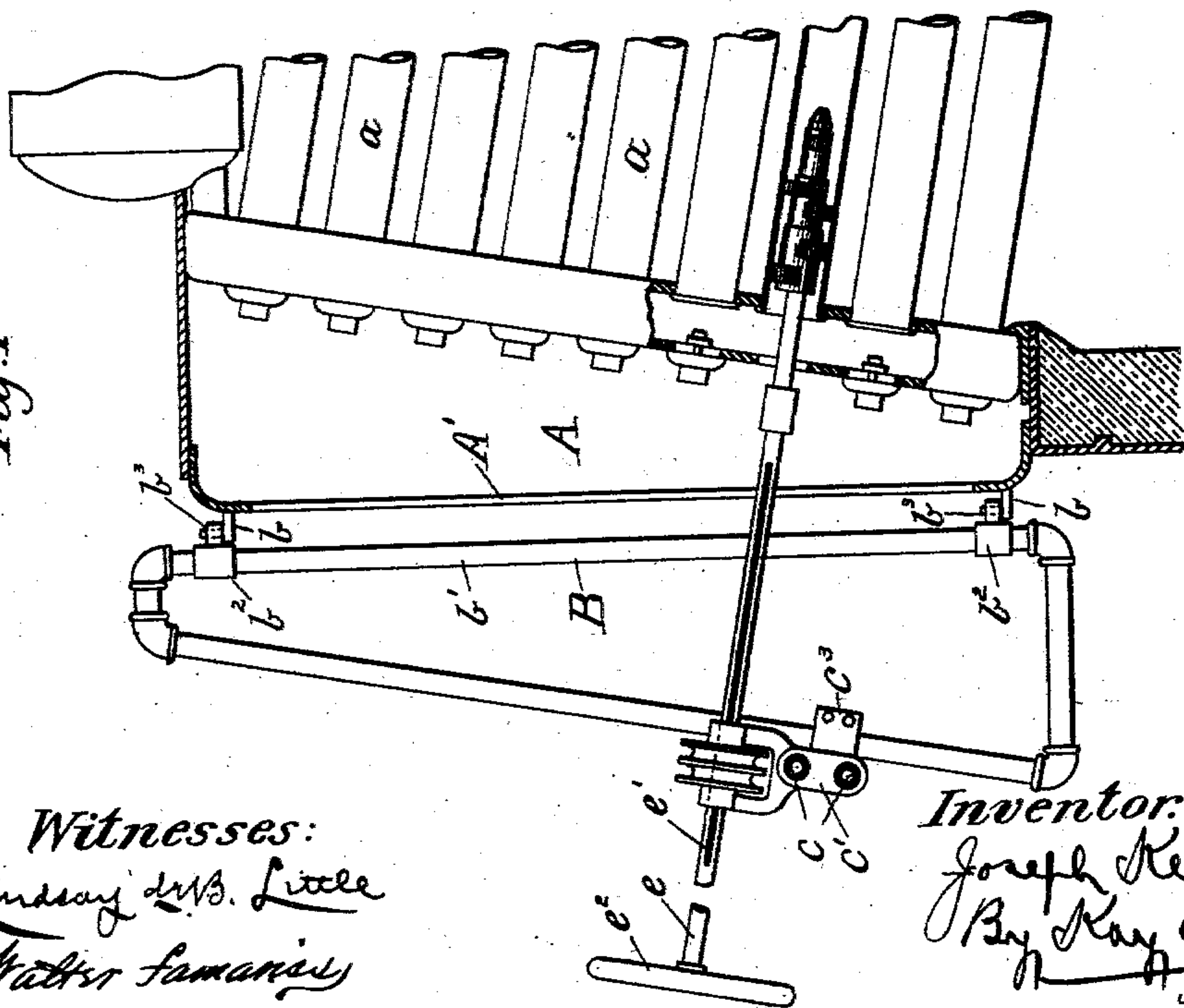


Fig. 1



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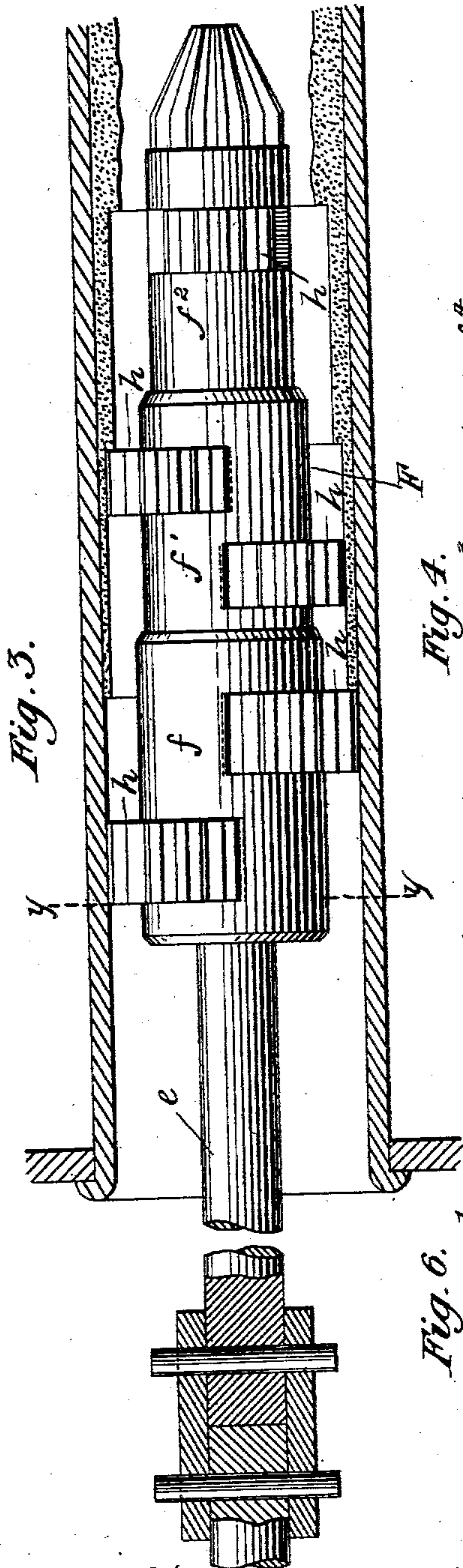
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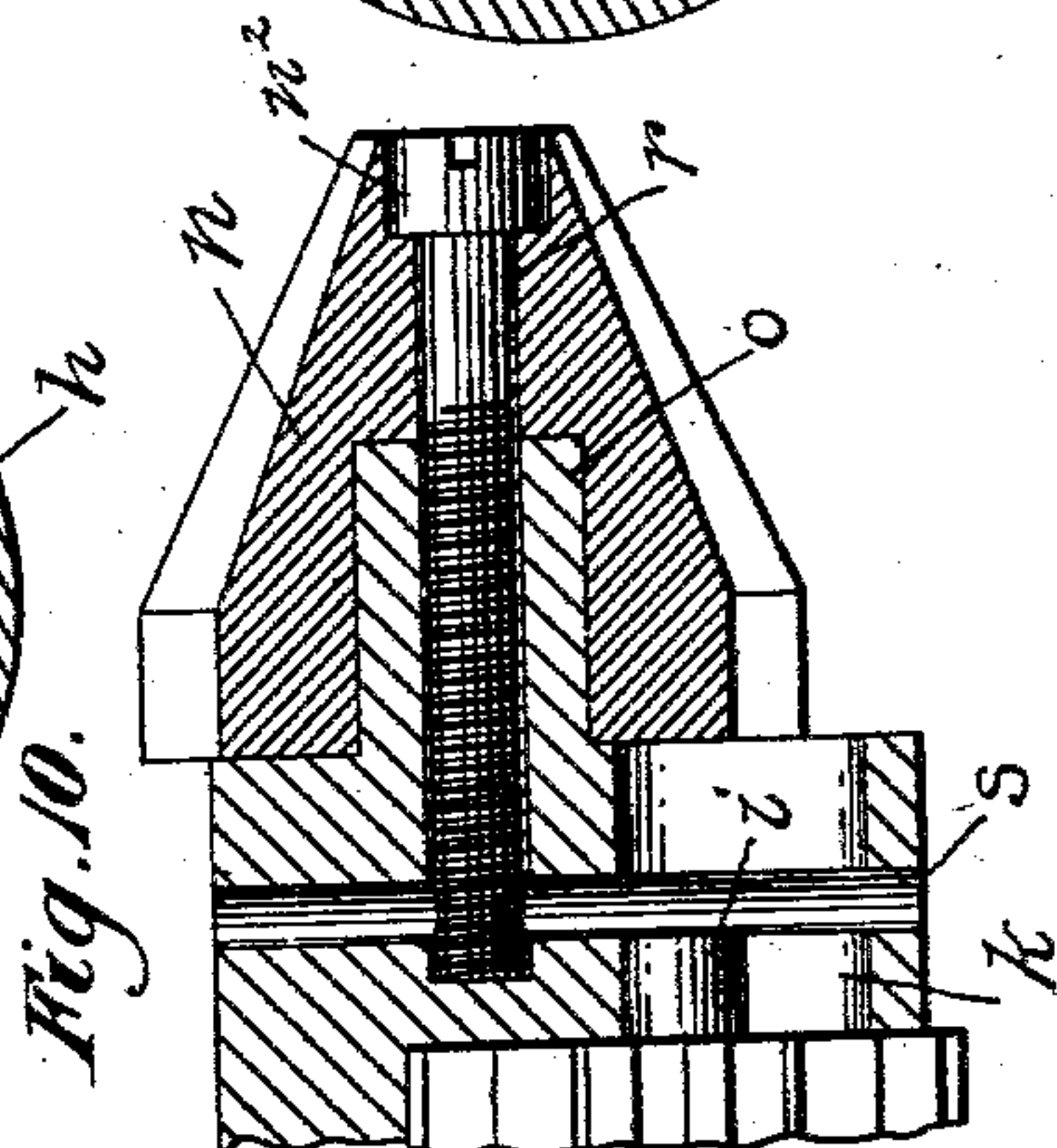
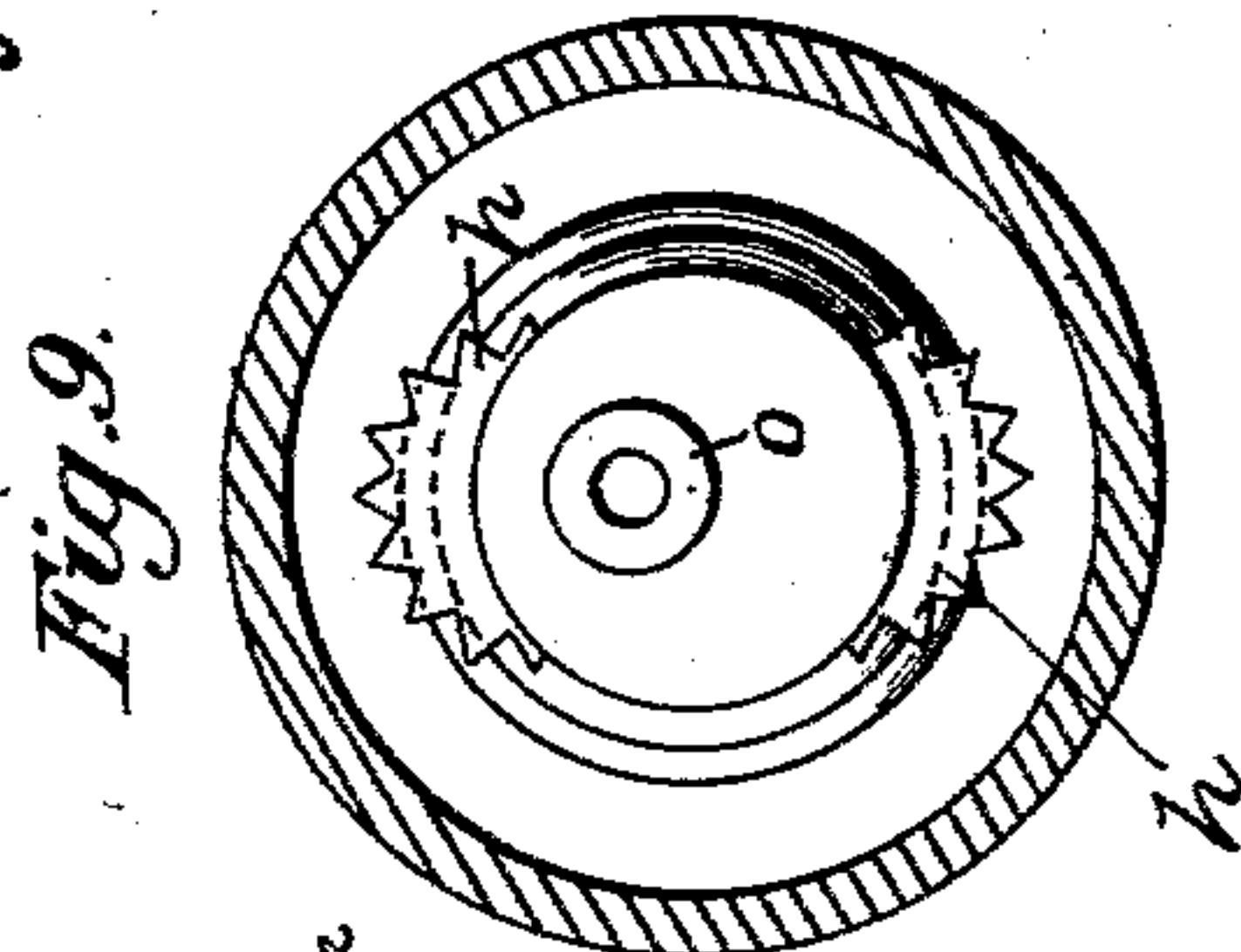
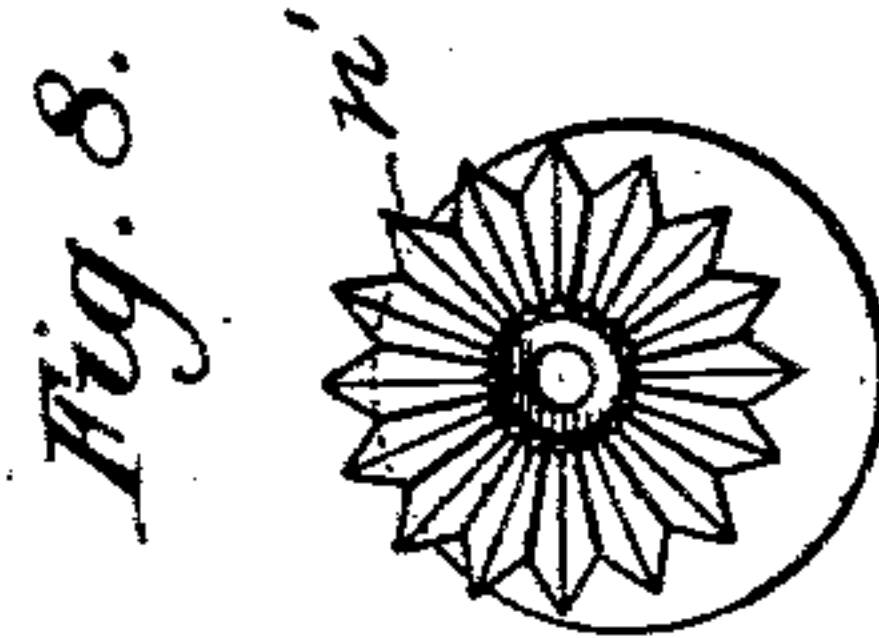
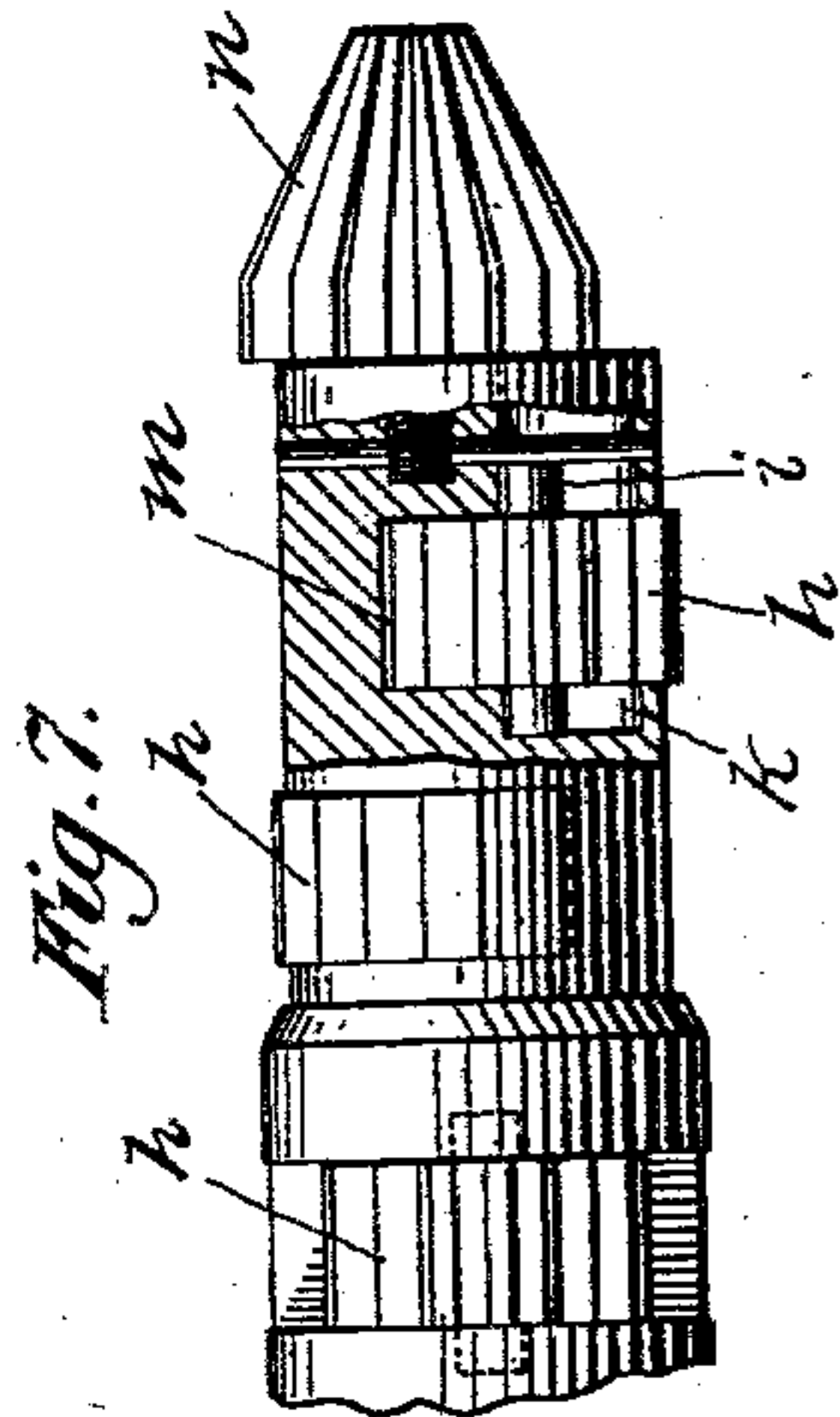
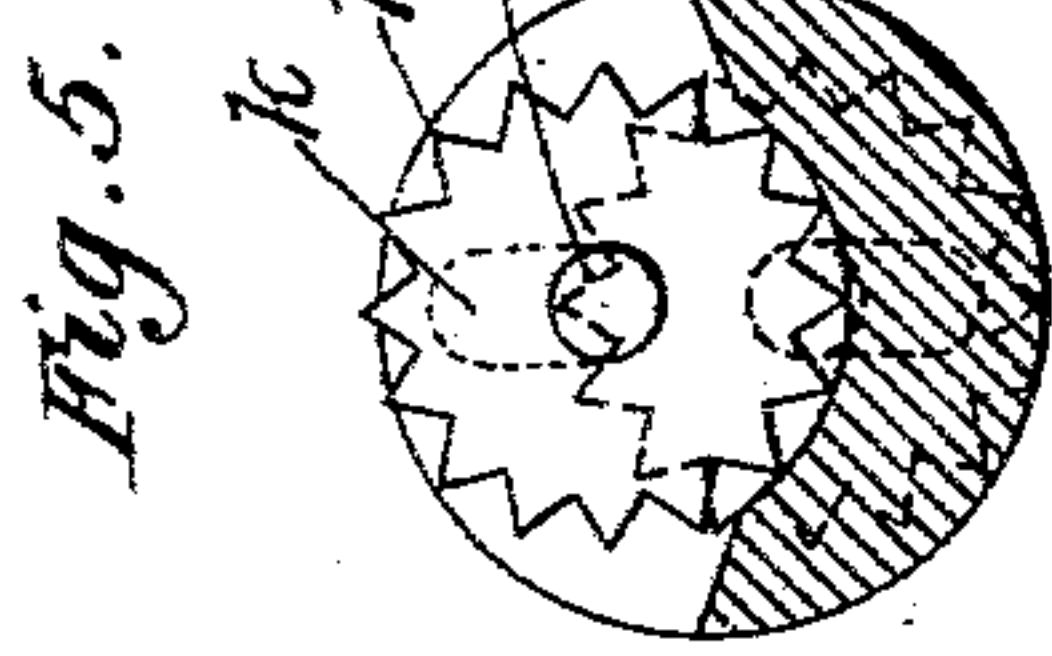
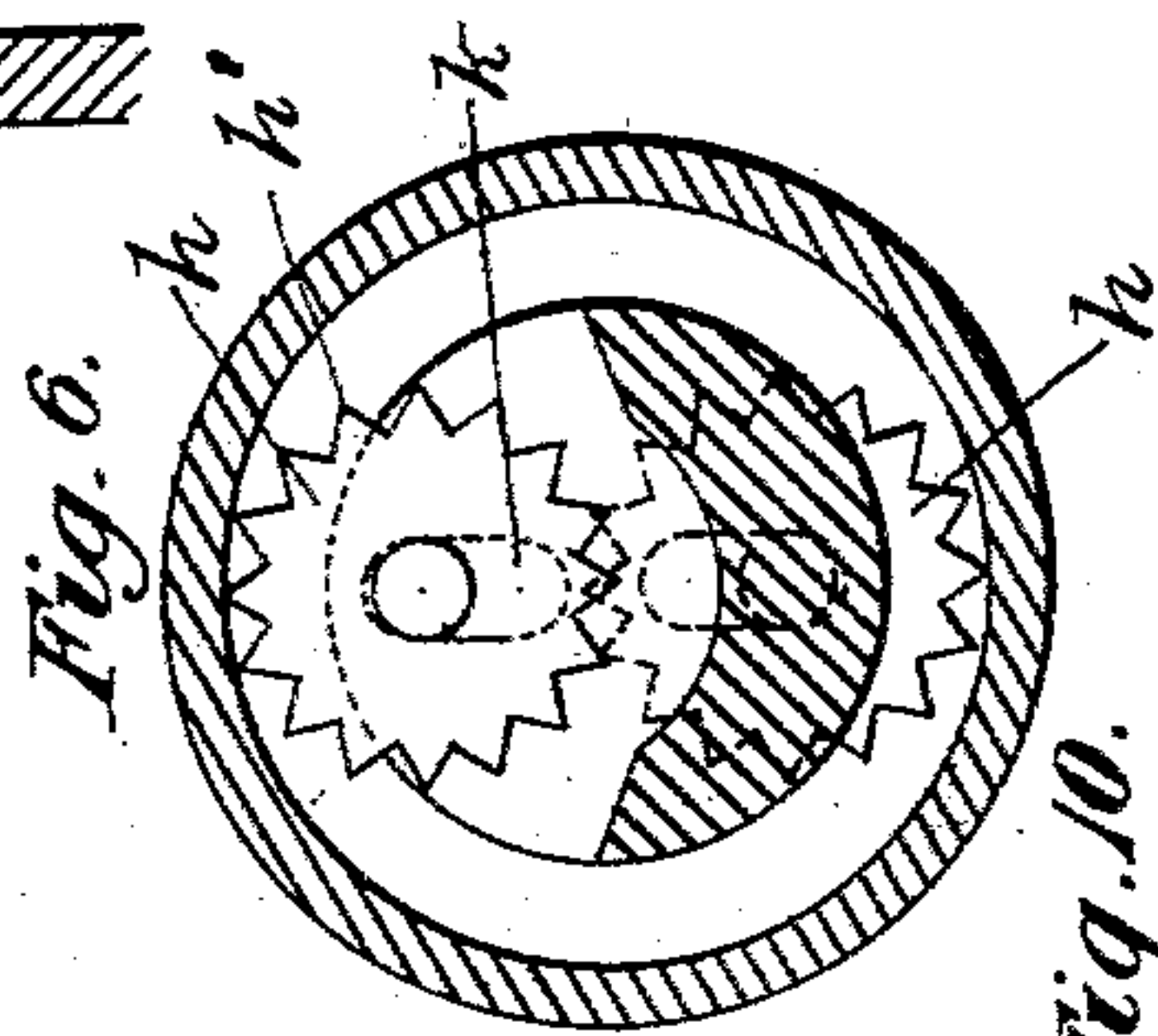
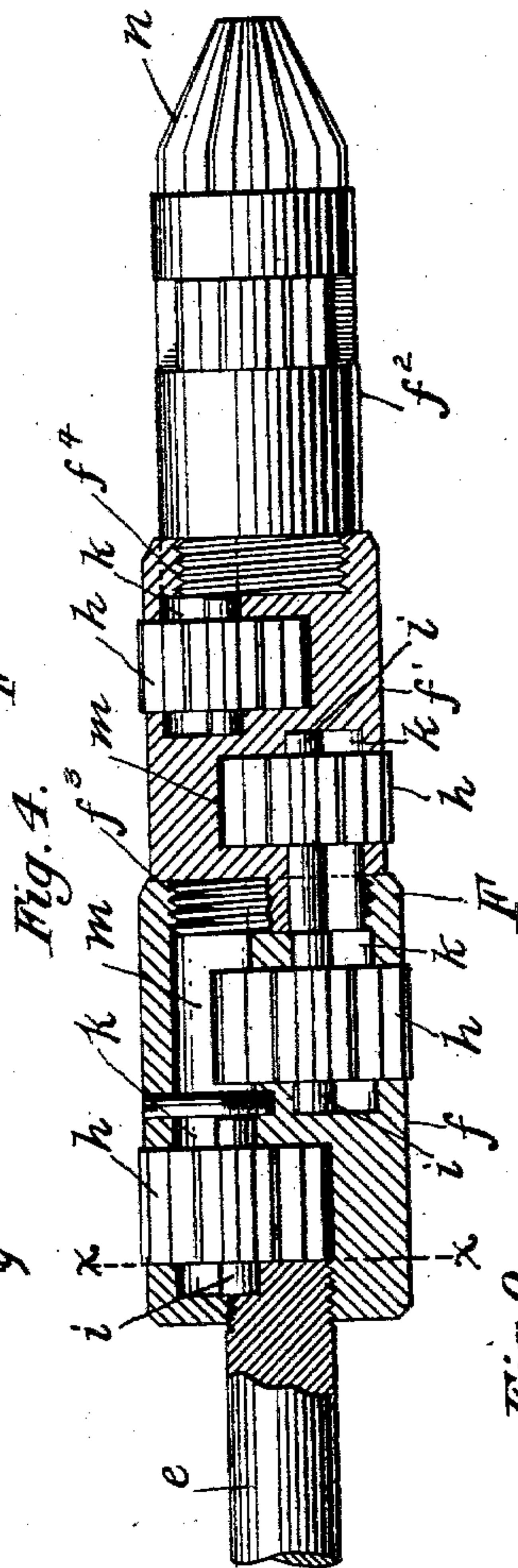
(Application filed Jan. 18, 1899.)

2 Sheets—Sheet 2.

(No Model.)



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UNITED STATES PATENT OFFICE.

JOSEPH KEENAN, OF ALLEGHENY, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO WILLIAM G. LINDSAY, OF PITTSBURG, PENNSYLVANIA.

BOILER-TUBE CLEANER.

SPECIFICATION forming part of Letters Patent No. 629,080, dated July 18, 1899.

Application filed January 18, 1899. Serial No. 702,554. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH KEENAN, a resident of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Boiler-Tube Cleaners; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to boiler-tube cleaners.

10 The object of my invention is to provide a boiler-tube cleaner which will be simple in construction and capable of withstanding the severe work to which said boiler-tubes are often subjected in the cleaning of a badly-incrusted tube.

To these ends my invention comprises the novel features hereinafter claimed.

20 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 side view, partly in section, of a suitable boiler with attachments for supporting the tube-cleaner during operation and showing the tube-cleaner inserted in one of the tubes of the boiler. Fig. 2 is a front view of same. Fig. 3 is an enlarged longitudinal section of a portion of a boiler-tube and with my improved cleaner therein, this view showing the cutters as thrown out by the centrifugal force and engaging the scale on the interior of the tube. Fig. 4 is a longitudinal sectional view of a portion of the head of my improved tube-cleaner, showing the manner in which the different sections of the head are joined together and the manner in which the cutters are supported within the slotted seats in said head. Fig. 5 is a section on the line $x x$, Fig. 4; and Fig. 6 is a section on the line $y y$, Fig. 3. Fig. 7 is a partial sectional view of the forward end of the head, showing the manner in which the foremost cutter is supported, it also showing the cutter-nose mounted slightly eccentric to the main axis of the head. Fig. 8 is a front view of the cutter-nose. Fig. 9 is a front view of the outer section of the head with cutter-nose removed; and Fig. 10 is an enlarged view of the cutter-nose, showing the manner in which it is held in position.

Like letters of reference indicate like parts in each view.

In the drawings the letter A represents a boiler of suitable construction; the boiler in this instance employed having the inclined boiler-tubes a . Secured to the front plate A' of the boiler are the brackets b , which support the frame B. This frame is preferably formed of sections of tubing properly connected, the inner tubes b' having the rings b^2 , with the projections b^3 adapted to engage with the brackets b to support the frame properly. The frame B has the guides c , upon which the slide c' is adapted to move. This slide c' can be readily moved over the guides c to bring the cleaner into proper line with the different tubes in the manner hereinafter set forth. Supported in the slide c' is the pulley c^2 , which is adapted to be connected up to suitable belting and to be driven at a high rate of speed. This pulley c^2 has a groove therein, with which a key or feather e' on the rod e is adapted to engage, whereby the rod e is revolved by said pulley, and at the same time said rod can be moved back and forth there- in by means of the handle e^2 .

At the forward end of the rod e is the head F. This head is preferably formed of two or more sections $f f' f^2$. The largest section f is secured onto the outer end of the rod e . The section f' , which is smaller in diameter than the section f , has the threaded portion f^3 , which engages the threaded seat in the section f . The foremost section f^2 is in turn smaller in diameter than the preceding section f' , and the threaded portion f^4 thereon engages with the threaded seat in said section f' . It is of course apparent that any suitable number of sections may be employed.

Each section $f f' f^2$ is provided with one or more cutters h , said cutters being circular in form and having the cutting edges h' , as shown in Fig. 5. The cutters h are mounted on pins i , which pass through openings h^2 in said cutters.

To provide for the outward movement of the cutters when the head is rotated the pins i fit within the slotted seats k , formed in the different sections. These slotted seats are formed in each section and extend from one

end thereof down into the body of the section beyond the recesses m . While oblong or slotted seats are preferably employed, it is apparent that these seats may be of other shapes, provided they are large enough to permit of the outward throw of the cutters. In securing the cutters in place the cutter is first inserted into the recess m , when the pin i is then inserted in the slotted seat at one end and passes through the central opening h^2 of the cutter and then on through into the inner extremity of the seat, which extends beyond the recess m .

When the different sections are screwed together, the inner face of each section abutting against the outer face of the preceding section prevents the pins from falling from the slots and secures them in position, while at the same time by unscrewing the different sections the pins may be readily withdrawn and the cutters released, so that the cutters may be sharpened or new ones inserted in their places. This construction provides not only a very simple manner of mounting the cutters, but at the same time a very durable one, as the pins can be made sufficiently strong to withstand the severe action to which the cutters are subjected. The arrangement of the cutters with relation to each other may be varied as desired.

At the extreme forward end of the head F is the cutter-nose n , which acts, where the boiler is very badly incrustated, to cut a way into the scale for the entrance of the tool and as a preparation for the cutters which follow and which gradually enlarge the opening in the scale. This cutter-nose is tapering in form and has the cutters n' , as shown in face view Fig. 8. The cutter-nose is preferably mounted eccentrically to the main axis of the head in order that it may have an eccentric rolling motion. This cutter-nose n is mounted loosely on the eccentric stud o , projecting out from the section f^2 of the head F . A screw or bolt r enters a threaded opening in said stud o , the head of said screw entering the counter-sunk opening n^2 in said cutter-nose. A pin s passes through the section f^2 and through an opening in the screw r . This pin also acts to hold in place the pin i , on which the outer cutter of the outer section f^2 is mounted, as shown in Figs. 7 and 10.

When my improved boiler-tube cleaner is in use, the frame B is arranged as shown in Figs. 1 and 2 with reference to the boiler, and the rod e , carrying the head F , is brought into

proper position to enter one of the tubes a of the boiler. The adjustment of the guides c in a vertical plane is accomplished by means of the clamping-sleeves c^3 , which are adapted to slide vertically on the outer tubes of the frame and to be clamped rigidly in that proper position thereon. When, as stated, the head has been brought into proper position with reference to one of the tubes a , the operator then by means of the handle e^2 forces the rod e into the tube and power is then applied to rotate the pulley c^2 . This pulley is driven at a high rate of speed, and rotation is thus imparted to the head F . The rotation of the head F acts by centrifugal force to throw out the cutters h into contact with the scale, and these cutters being free to rotate act to cut out and break down the scale contained within the tubes. The cutter-nose going ahead acts to open a passage for the cutters just following, which have a slightly larger range of cut than the cutter-nose, and said cutters in turn open up the way for the cutters following, which have an increased range, and so on back to the cutters on the innermost section of the head.

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

1. In a boiler-tube cleaner, the combination of a rotatable rod or shaft, a head on same, said head being composed of two or more sections screwed together, said sections having recesses formed therein and slotted seats extending from the ends of said sections to a point within and beyond said recesses, and pins within said seats, cutters on said pins and within said recesses, the abutting ends of said sections closing the open ends of said seats, substantially as set forth.

2. In a boiler-tube cleaner, the combination of a rotatable rod or shaft, a head on same, and a single conical nose having cutters extending longitudinally thereof, said nose being mounted loosely on said head and eccentrically thereof, and at its base approximately of the same diameter as the outer end of said head, said head having a recess back of the conical nose, and a cutter being mounted in said recess, substantially as set forth.

In testimony whereof I, the said JOSEPH KEENAN, have hereunto set my hand.

JOSEPH KEENAN.

Witnesses:

ROBT. D. TOTTEN,
ROBERT C. TOTTEN.