

No. 622,681.

Patented Apr. 11, 1899.

W. D. HERVEY.  
BOILER TUBE CUTTER AND EXPANDER.

(Application filed Apr. 20, 1898.)

(No Model.)

3 Sheets—Sheet 1.

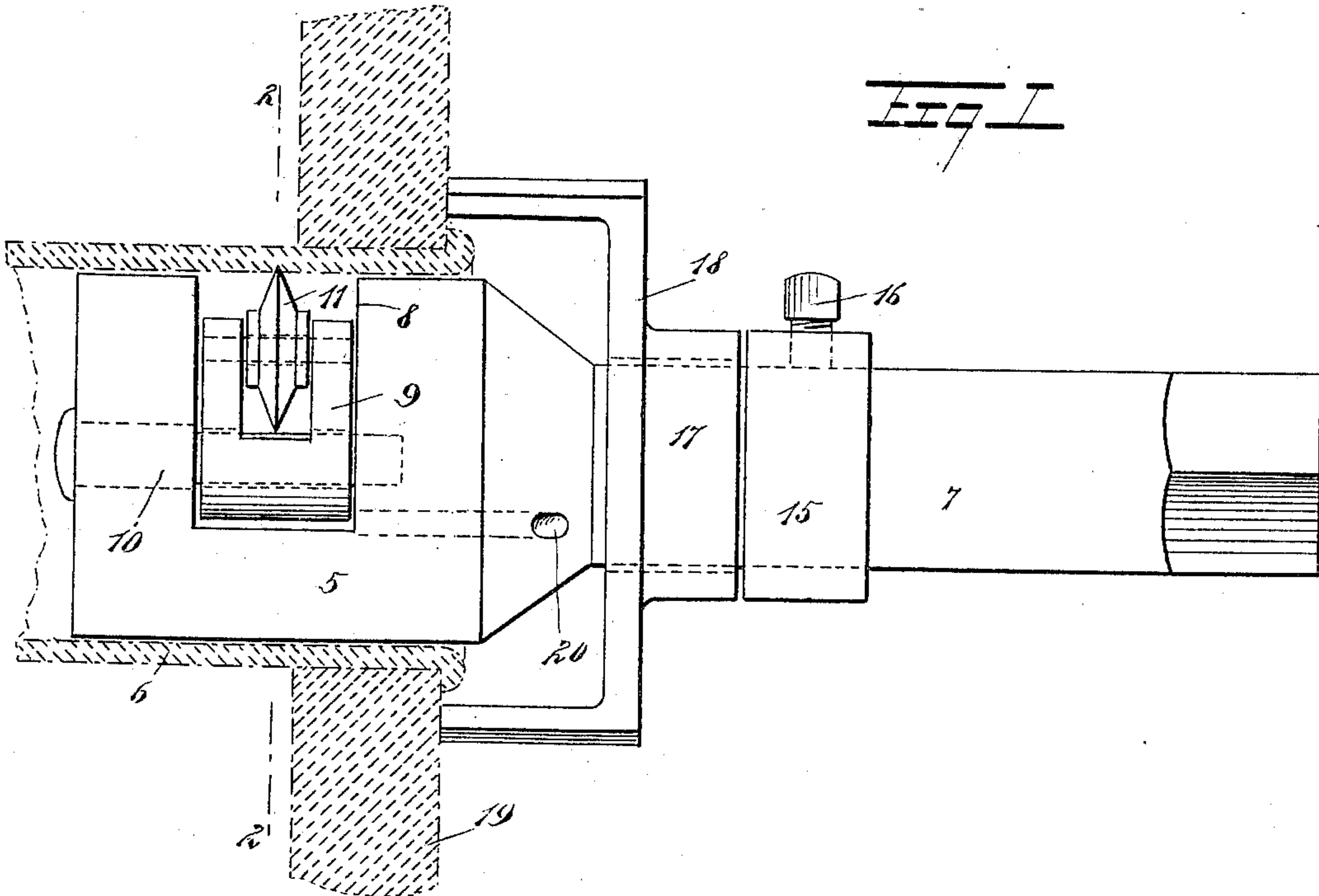


Fig 1

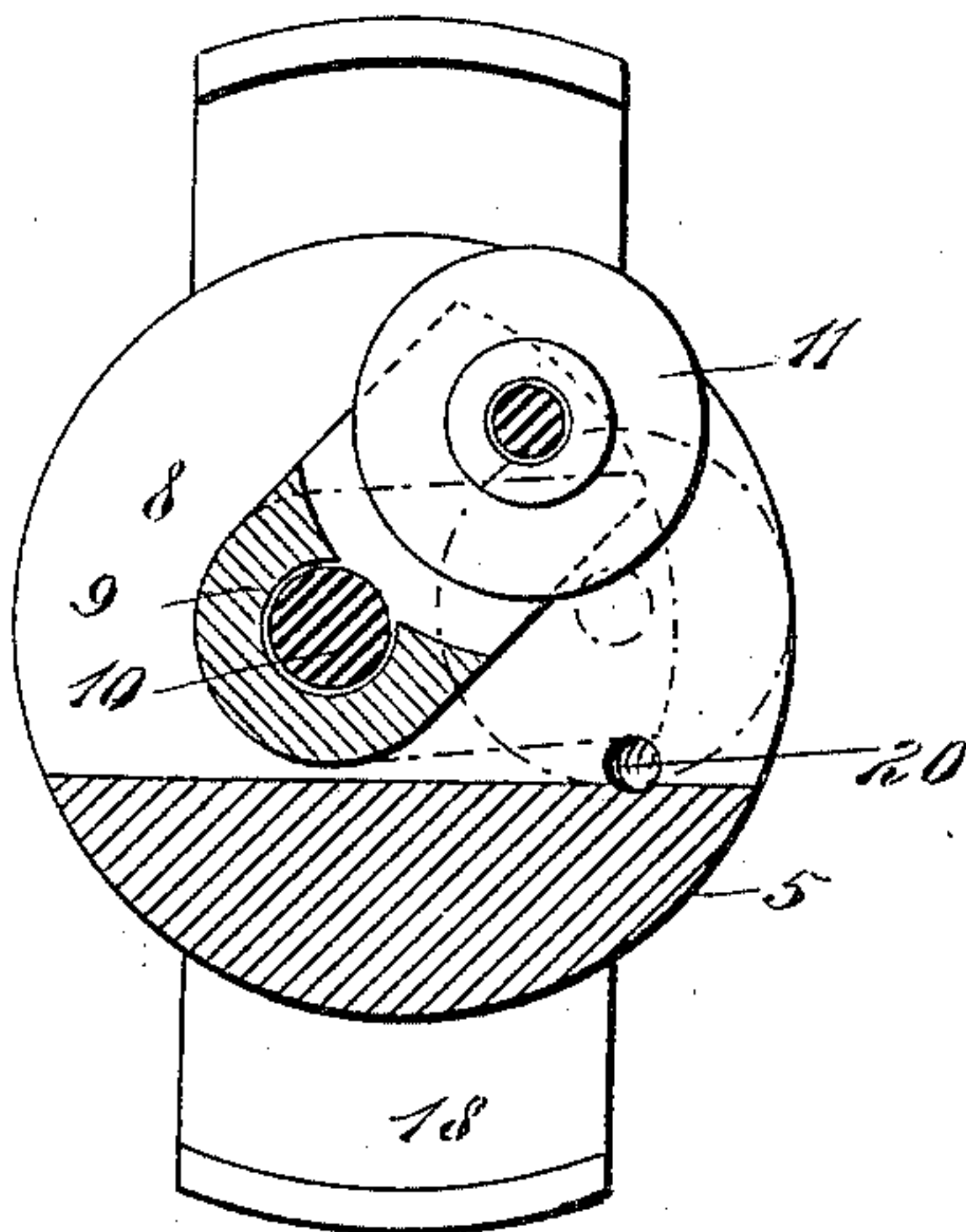


Fig 2

Fig 3

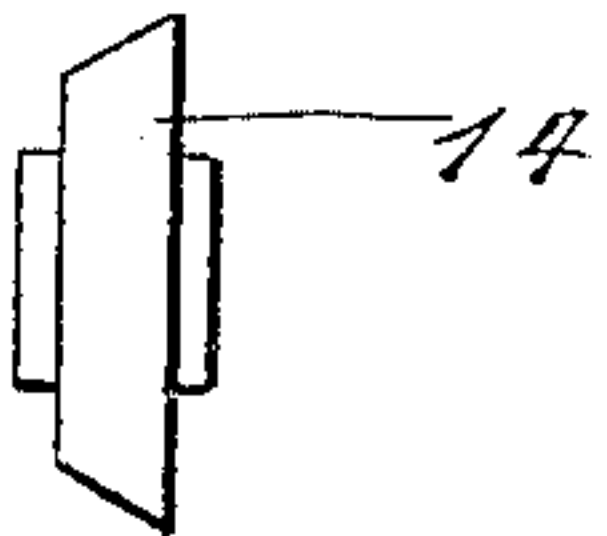
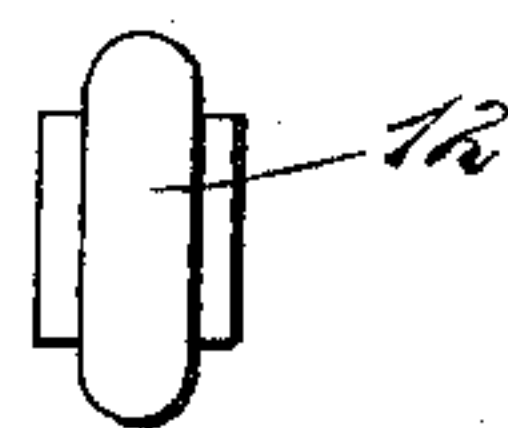


Fig 4



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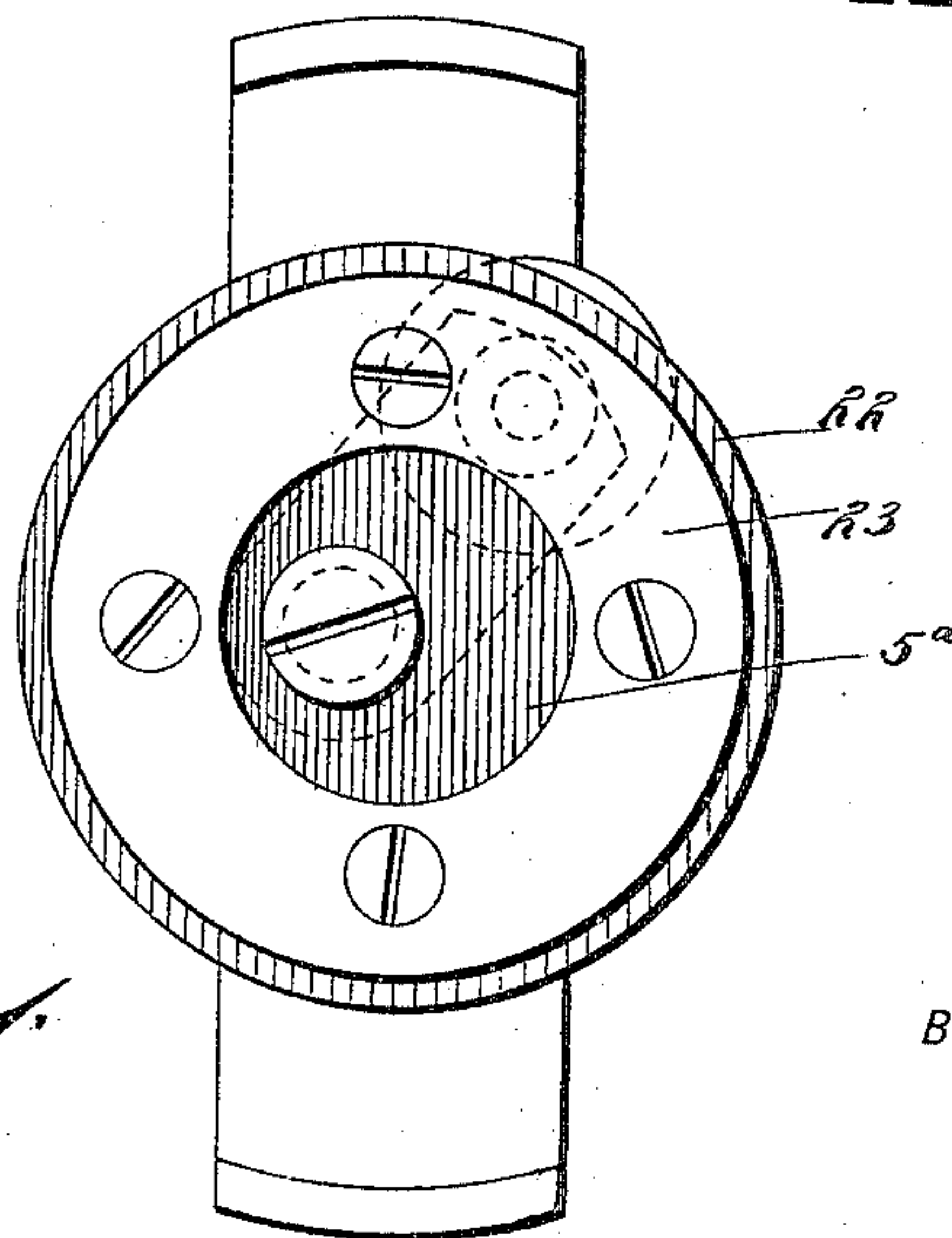
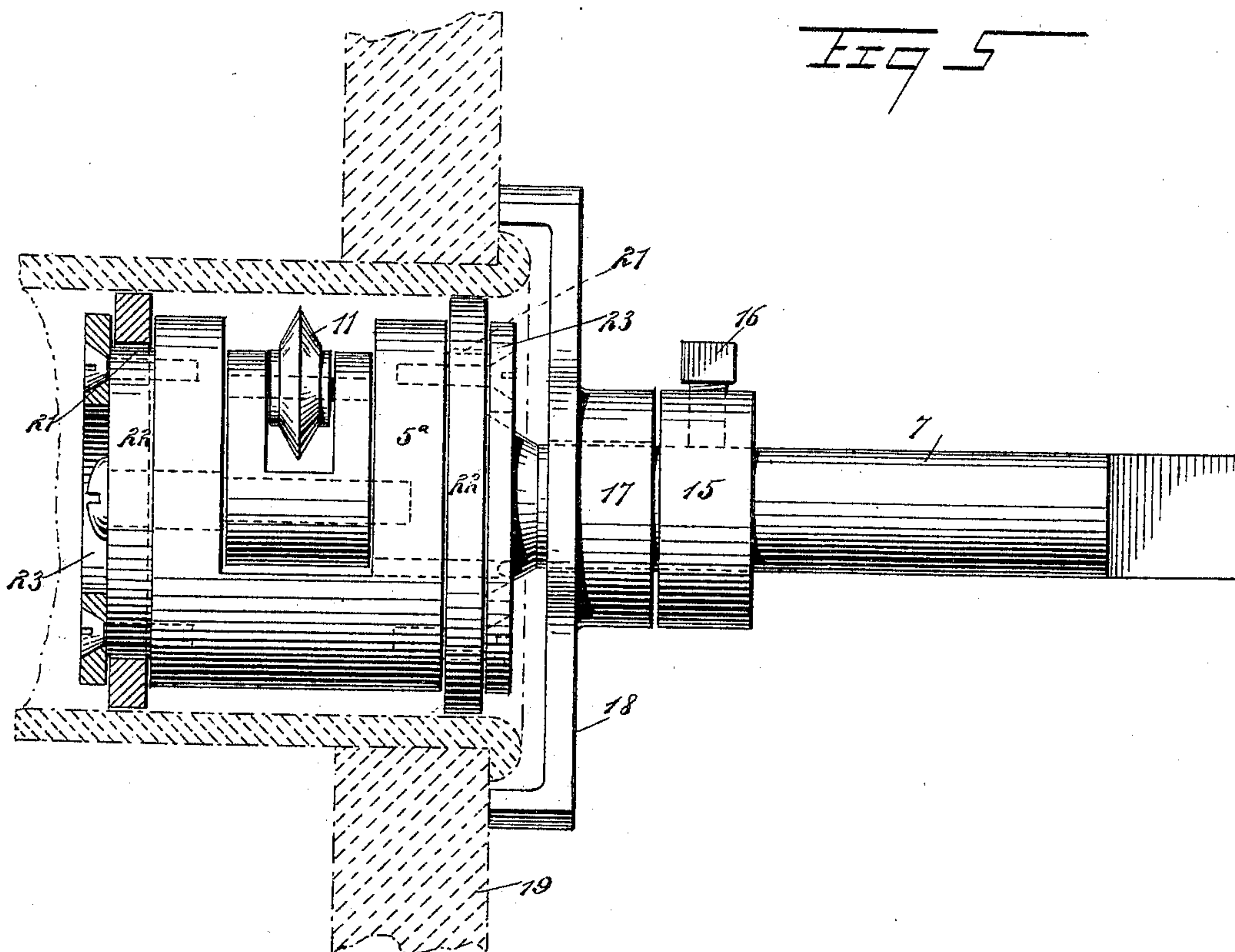
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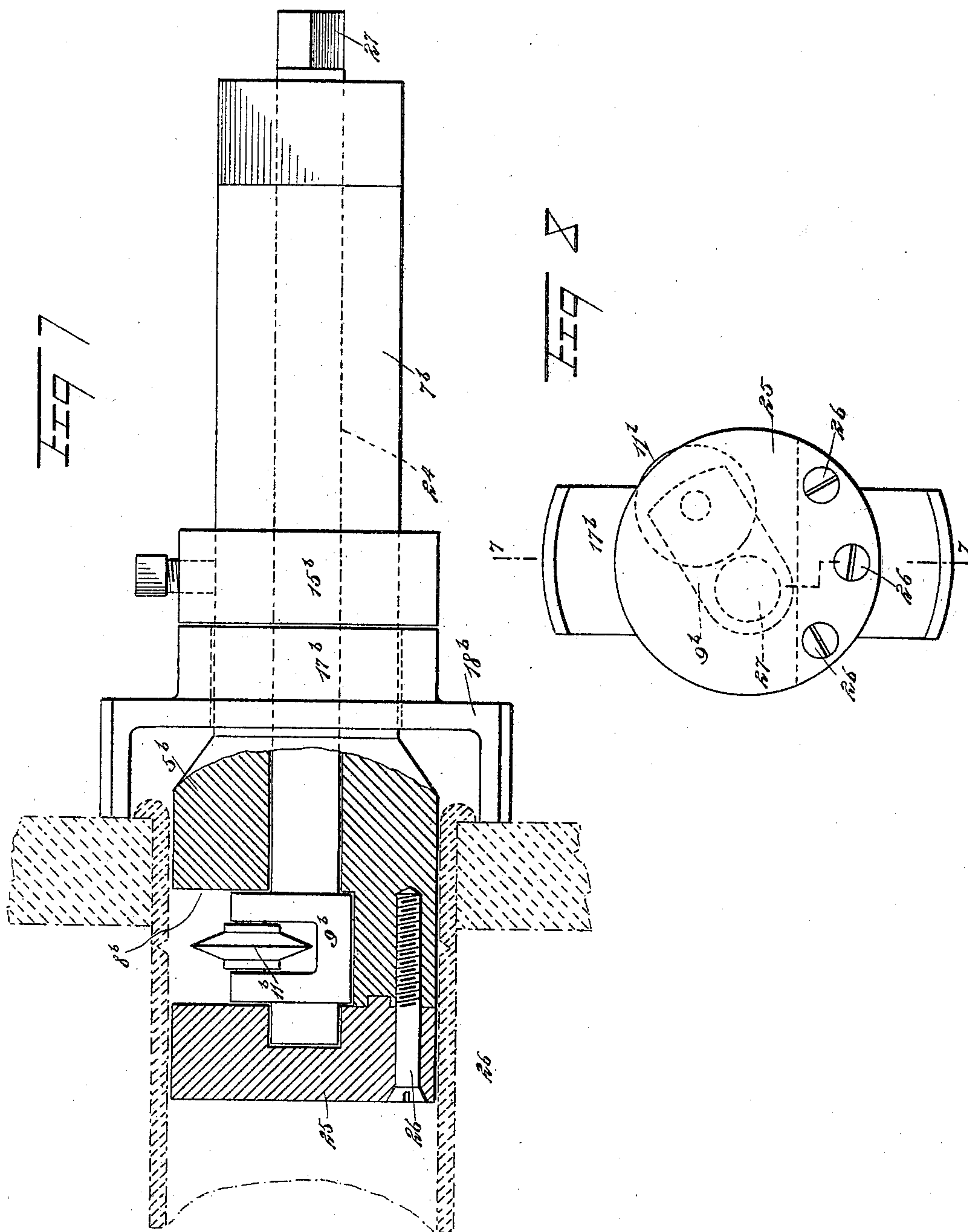
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# UNITED STATES PATENT OFFICE.

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## BOILER-TUBE CUTTER AND EXPANDER.

SPECIFICATION forming part of Letters Patent No. 622,681, dated April 11, 1899.

Application filed April 20, 1898. Serial No. 678,229. (No model.)

*To all whom it may concern:*

Be it known that I, WALTER D. HERVEY, of Chenoa, in the county of McLean and State of Illinois, have invented a new and Improved Boiler-Tube Cutter and Expander, of which the following is a full, clear, and exact description.

This invention is an apparatus for cutting off boiler-flues and also for expanding the flues to form beads thereon, the cutting operation being performed preparatory to removing the old flue and the expanding operation being performed on the new flue to hold the same in place.

This specification is the disclosure of one form of my invention, while the claims define the actual scope of the invention.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the invention. Fig. 2 is a sectional view on the line 2 2 of Fig. 1. Fig. 3 is an edge view of a modified form of the cutter. Fig. 4 is an edge view of the expander. Fig. 5 is a side elevation of a further modification. Fig. 6 is an end elevation thereof. Fig. 7 is an elevation and partial section of a further modification on the line 7 7 of Fig. 8, and Fig. 8 is an inner end elevation thereof.

The tool as shown in Figs. 1 to 4 has a cylindrical body portion 5, adapted to fit snugly into the tube or flue 6, the latter being indicated by dotted lines in Fig. 1. The outer end of the body portion 5 tapers into a shank 7, having a square end, to which a wrench or handle may be connected. The body portion 5 of the cutter is provided with a cavity 8 therein, which extends transversely of the body portion and which receives an arm 9, mounted to swing therein on a pin 10, passed longitudinally through the body 5. The free ends of the arm 9 may carry a rotary cutter-wheel 11, such as is shown in Figs. 1 and 2, or an expander 12, such as is shown in Fig. 4. The cutter-wheel 11 has a double bevel and may, if desired, be replaced by a cutter-wheel having a single bevel, such as the cutter 14 of Fig. 3. The pin 10 is mounted eccentrically in the body portion 5, so that the arm 9

and the cutter or expander wheel that the same may carry will swing eccentrically to the cylindrical surface of the body 5. The parts are so disposed that when the arm and cutter are in the position shown by dotted lines in Fig. 2 the cutter will be held with its outer edge extending just to the side of the body portion; but as the arm 9 swings to the left from the position shown in dotted lines in Fig. 2 to the position shown by full lines in said figure or to a position beyond the same the eccentric movement of the arm will throw the cutter 11 beyond the sides of the body portion 5, and consequently the cutter will operate.

A collar 15 is held adjustably on the shank 7 by a fastening-screw 16. The collar 15 holds on the shank 7 the boss 17 of a yoke 18, which straddles the tapering end of the body 5 and is adapted to engage the flue-sheet 19 of the boiler, as indicated by the dotted lines in Fig. 1. By means of this yoke 18 the device is held properly in place.

In order to start the arm 9 from the position shown by dotted lines in Fig. 2, the body portion 5 is provided with a longitudinal passage 20, extending from the tapered end of the body portion to the cavity 8 therein. Through this passage 20 a pin or other instrument may be inserted to start the arm 9 in its movement to the left, (see Fig. 2,) whereupon as the cutter or expander engages the flue the movement of the arm will be effected automatically.

In using the invention the arm 9 is thrown from the position shown in full lines to that shown by dotted lines in Fig. 2 and the body 5 is inserted into the flue. Assuming that the flue is to be cut, the arm 9 should be provided with a cutter 11 or 14, and if the tube is to be expanded the expander 12 is applied to the arm. The yoke 18 should be adjusted, as shown in Fig. 1, so that inward pressure on the tool will not displace it. The body portion is now revolved with its shank by means of the wrench or handle engaged with the shank, whereupon the movement of the tool in the tube will cause the cutter or the expander to engage or bind against the tube and perform its functions. It will be seen that the rotation of the body portion in the flue will force the arm 9 to the left, as shown in Fig. 2, and that as this movement increases



the distance that the cutter or expander enters the flue also increases. The tool thus automatically feeds the cutter or expander as fast as its operation makes the feed necessary.

The modification shown in Figs. 5 and 6 differs from the other form of the invention in that the body 5<sup>a</sup> is provided at each end with a reduced portion 21, forming a journal, whereon is placed a revoluble annulus 22. Each annulus 22 is held in place by a plate 23, screwed or otherwise secured to the ends of the body portion. Each annulus 22 serves to revolvably mount the body portion 5<sup>a</sup>, since each annulus is arranged to engage the inner face of the flue being worked on. Various-sized annuluses may be kept in stock and changed at will to suit various-sized flues.

The modified form of the invention as shown in Figs. 7 and 8 has its shank 7<sup>b</sup> formed with an eccentric passage 24, run longitudinally through it and passing into the head 5<sup>b</sup>. The head 5<sup>b</sup> has a recess 8<sup>b</sup> formed therein, and the head is provided at its inner end with a cap 25, held upon the head by screws 26. The boss 17<sup>b</sup>, yoke 18<sup>b</sup>, and collar 15<sup>b</sup> are similar to those previously described. The passage 24 receives a rod 27, which projects outward from the shank and has its outer end squared to receive a wrench. The inner end of the rod 27 has an arm 9<sup>b</sup>, attached in any suitable manner and similar to the arm 9 before described and carrying a tool 11<sup>b</sup>, also similar to the tool 11 before described. The cap 25 holds the inner end of the rod 27, so that the rod may be inserted from the inner end of the head and then engaged by the cap 25, so as to hold the rod revolvably in place. By this construction the position of the arm 9<sup>b</sup> may be effectively controlled, and when it is desired to engage the tool with its work the rod 27 may first be turned to engage the tool, and thus the shank

and body may be turned to perform the work. It should be understood that the arm 9<sup>b</sup> is eccentric with reference to the body 5<sup>b</sup>, as previously described with reference to the parts 9 and 5.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A boiler-tube cutter and expander having a body portion, a shank attached to one end thereof, a yoke carried on the shank and serving to hold the body portion in operative position, an arm mounted in a recess in the body portion, the arm swinging on a pivot eccentric to the periphery of the body portion and being disposed so that the turning of the body portion will cause the arm to move outwardly and jam against the interior of the tube, and a tool carried in the free portion of the arm, the tool being carried with the arm to a point outside of the periphery of the body portion, or to a point inward of the same.

2. A boiler-tube cutter and expander having a body portion with a recess therein, a shank attached to one end of the body portion, a yoke carried by the shank and serving to hold the body portion in operative position, a pin fitted in the body portion and extending through the recess, the pin being eccentric to the periphery of the body portion, an arm mounted to swing on the pin and being disposed so that the turning of the body portion will cause the arm to move outwardly and jam against the interior of the tube, and a tool carried by the arm, the tool moving with the arm to a position outside of the periphery of the body portion, or to a position within such periphery.

WALTER D. HERVEY.

Witnesses:

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A. D. JORDAN.