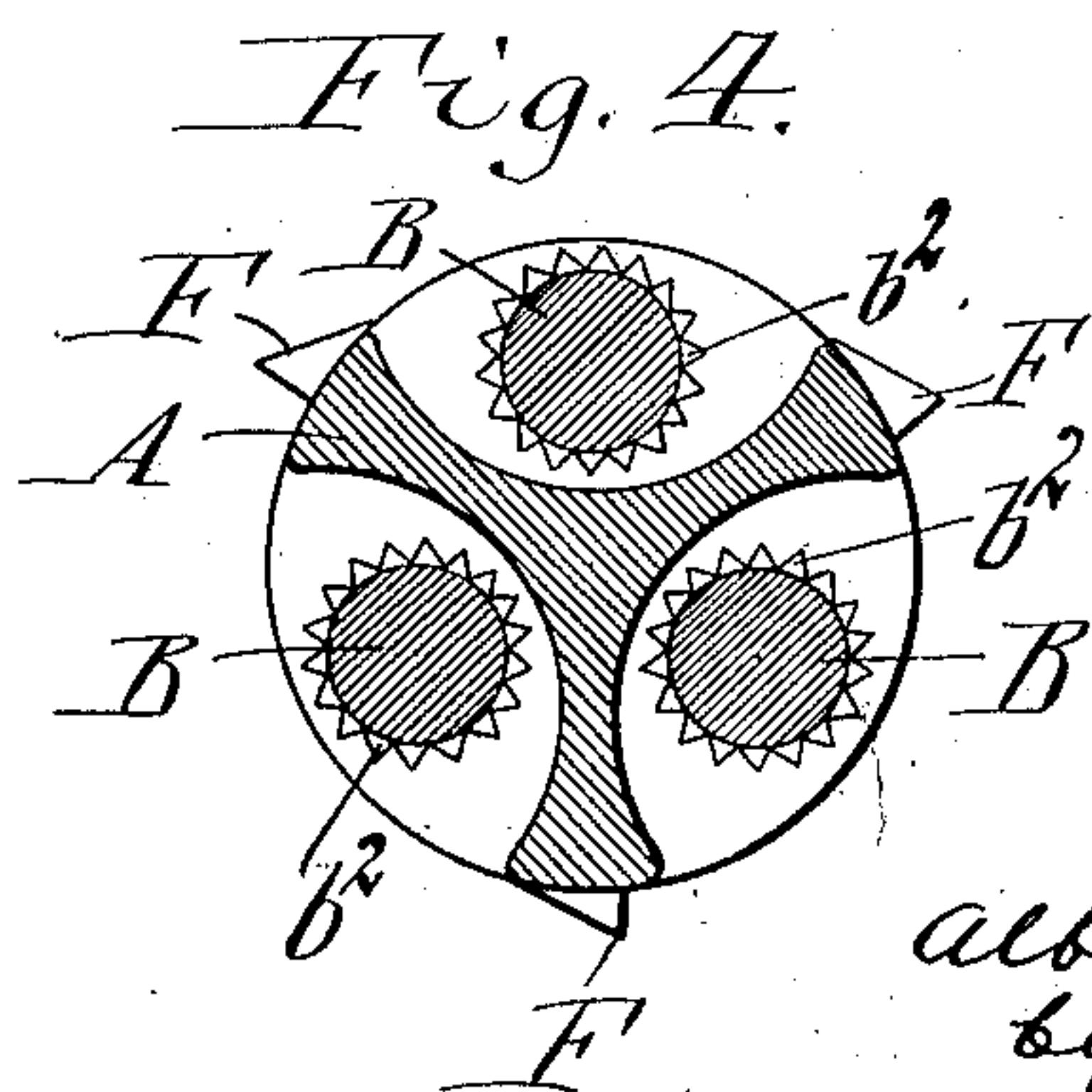
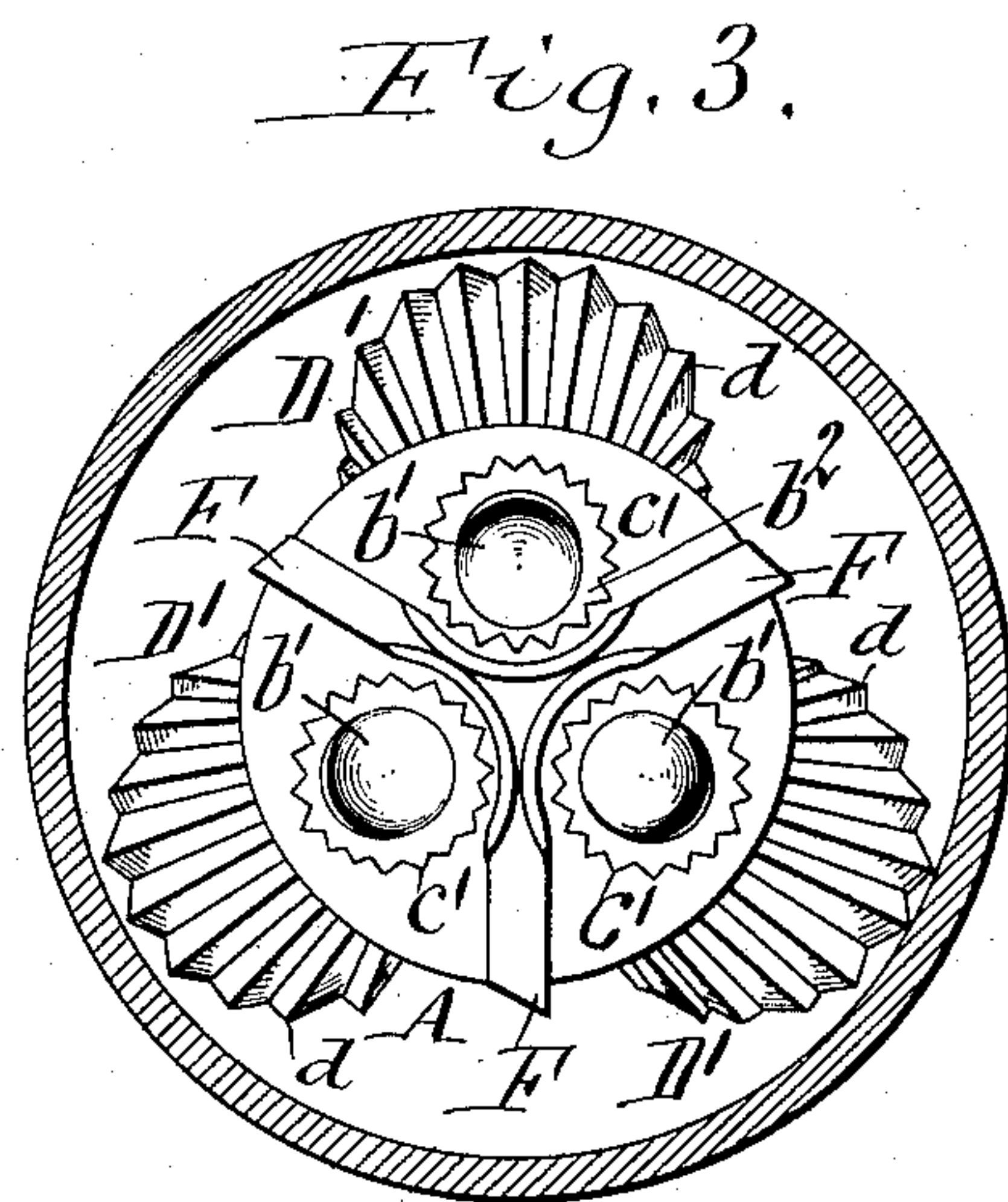
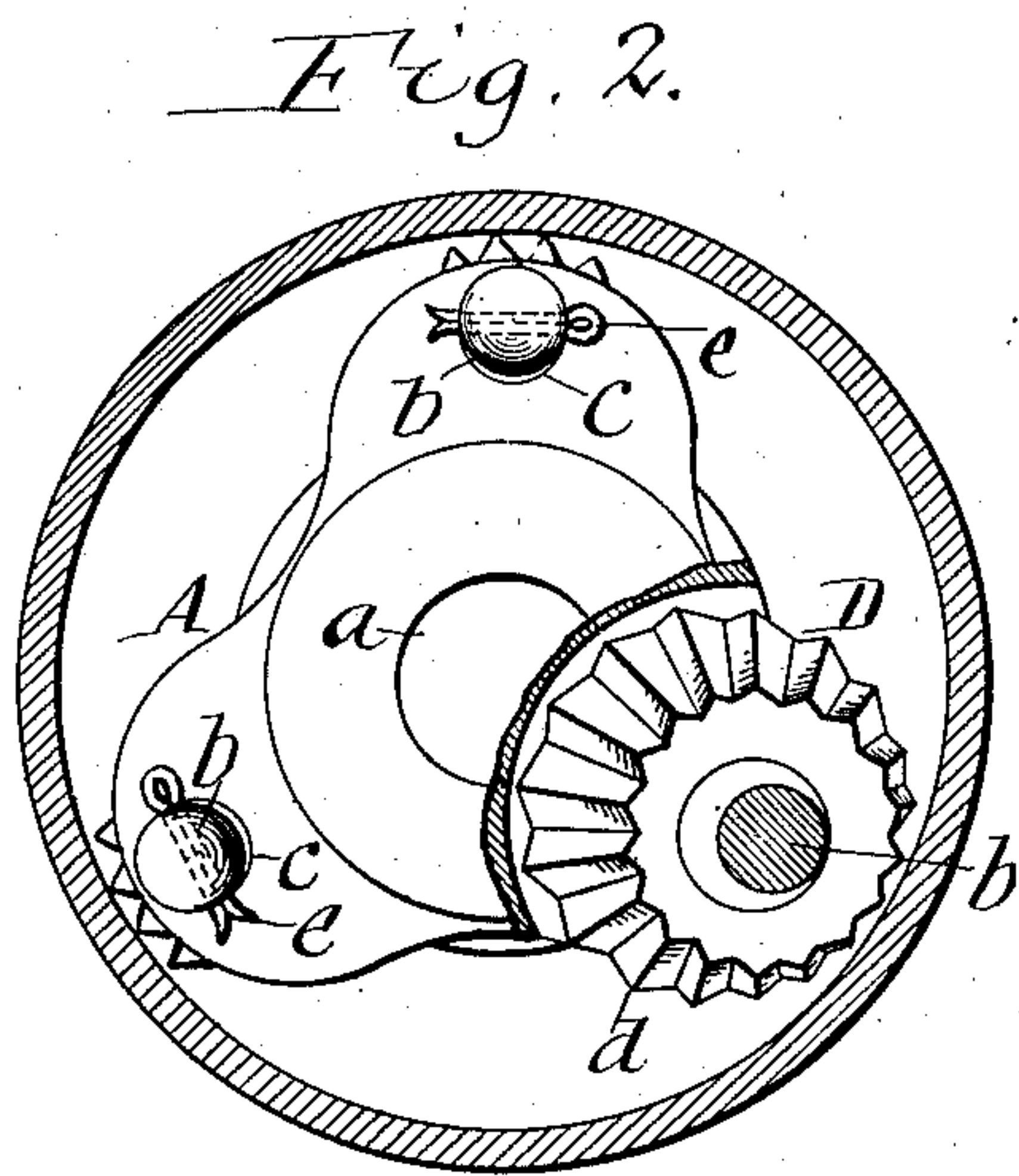
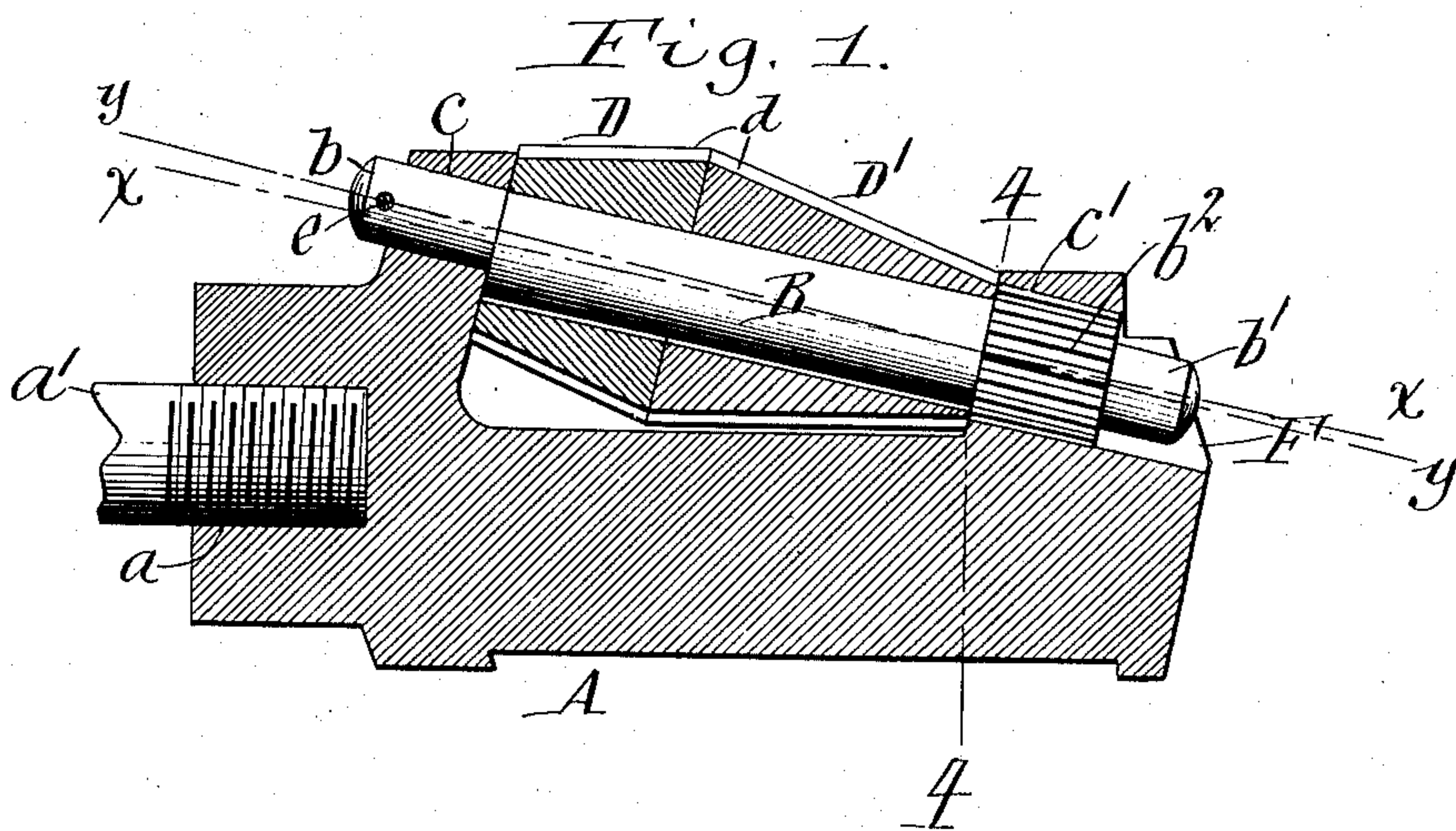


A. F. KRAUSE.
BOILER TUBE CLEANER.
APPLICATION FILED APR. 15, 1907.

906,898.

Patented Dec. 15, 1908.



Witnesses:
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UNITED STATES PATENT OFFICE.

ALBERT F. KRAUSE, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-HALF TO CHARLES C. LADD,
OF BUFFALO, NEW YORK.

BOILER-TUBE CLEANER.

No. 906,898.

Specification of Letters Patent.

Patented Dec. 15, 1908.

Application filed April 15, 1907. Serial No. 368,390.

To all whom it may concern:

Be it known that I, ALBERT F. KRAUSE, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Boiler-Tube Cleaners, of which the following is a specification.

This invention relates to the rotary cleaners or cutter-heads employed for removing the scale or incrustation from the tubes of water-tube boilers, and more especially to cleaners of this kind having toothed, forwardly-converging roller-cutters.

The object of this invention is the production of a strong, effective and durable cleaner of this character in which the cutters can be readily adjusted toward or from the cleaner-head to adapt the tool to the varying thickness of scale in different tubes and to take up wear of the cutters.

In the accompanying drawings: Fig. 1 is a longitudinal central section of the cleaner. Fig. 2 is a rear view thereof, partly in section. Fig. 3 is a front view of the same. Fig. 4 is a transverse section in line 4—4, Fig. 1.

Similar letters of reference indicate corresponding parts throughout the several views.

A indicates the head or frame of the cleaner provided in its rear end with a screw-threaded socket *a* adapted to receive the threaded front end of a shaft *a*¹ which is driven by a motor of any suitable construction not shown in the drawings.

Equidistant around this head are arranged a number of longitudinal forwardly-converging shafts B, preferably three, which are supported in openings or bearings *c*, *c*¹ formed in flanges projecting from the head. Upon these shafts are loosely mounted rotary cutters D, D¹ having peripheral teeth *d* of any suitable form which cut and crush the scale as the cutters roll rapidly over the same. Two cutters are preferably journaled on each shaft, as shown, and the front one tapers forwardly and the rear one in the opposite direction, the adjoining ends of the two cutters being of about the same diameter.

It is desirable to render the cutters adjustable toward and from the axis of the head A to adapt the tool to the varying thickness of scale in different boiler-tubes and to take up wear of the cutters, especially the rear cutters and the rear portion of the front cutters. For this purpose, the end portions *b*, *b*¹ of each shaft B are arranged axially in line with

each other, while the intermediate body of the shaft, particularly its rear portion is offset or arranged eccentrically to said end portions, so that upon turning the shaft in its bearings the cutters are moved inwardly or outwardly on the head more or less. The degree of throw or eccentricity of each shaft preferably diminishes gradually toward its front end, as shown, so that practically no radial movement occurs at the forward end of the front cutters in adjusting the cutters.

In Fig. 1 the dotted line *x—x* indicates the axis of the shaft around which the cutters revolve in operation, while the dotted line *y—y* indicates the axis upon which the shaft turns in adjusting the cutters.

Any suitable means may be employed for normally locking the adjustable shafts against rotation in their bearings. In the construction shown in the drawings, the cylindrical rear end *b* of each shaft is fitted in a plain or smooth bearing, while its front portion *b*¹ is provided with longitudinal teeth or projections *b*² which interlock with corresponding grooves formed in the corresponding bearing *c*¹, and extending throughout the length of the latter.

Each shaft is held against forward displacement by a removable pin or cotter *e* passed through its rear end and against rearward displacement by the shoulder formed at the junction of its eccentric portion and its reduced rear end.

To adjust the cutters, the cotters *e* are removed and the shafts B are slid forward sufficiently to disengage their locking teeth *b*² from the grooved front bearing *c*¹. The shafts are then turned to effect the desired adjustment, after which they are returned to their former position and the cotters are replaced.

If desired, the arrangement of the locking devices of the adjustable shafts may be reversed, the locking teeth *b*² being placed on the rear ends of the shafts and the cotters at their front ends.

As shown in Fig. 1, a slight play is preferably left between the shaft and the bores of the cutters, say about a thirty-second of an inch, to permit the cutters to move outward by centrifugal force and adapt themselves to inequalities of the boiler tubes.

By mounting the cutter-shafts rigidly on the head A, the cleaner cannot be advanced or pushed through the boiler tube without removing the scale; the operator therefore

knows that so long as the tool advances it is cleaning properly.

The head may be provided at its front end with a number of fixed radial cutters F, if
5 desired.

I claim as my invention:

1. In a boiler tube cleaner, a scale-de-
tacher comprising a head, a shaft arranged
lengthwise thereon, capable of rotary adjust-
10 ment and having an eccentric or offset por-
tion, and a cutter or cutters mounted on the
eccentric portion of the shaft, substantially
as set forth.

2. In a boiler tube cleaner, a scale-de-
15 tacher comprising a head, a shaft arranged
lengthwise thereon and capable of rotary ad-
justment, the shaft being provided with an
eccentric portion and with teeth adapted to
interlock with corresponding grooves in one
20 of the shaft-bearings, and a cutter or cutters
journaled on the eccentric portion of the
shaft, substantially as set forth.

3. In a boiler tube cleaner, a scale-de-
tacher comprising a head having shaft-bear-
25 ings, one of which is provided with internal
longitudinal locking grooves, a shaft ar-
ranged in said bearings and capable of end-
wise movement therein, the shaft having an
eccentric portion and longitudinal teeth in-
30 terlocking with said grooved bearing, means

for preventing longitudinal displacement of
the shaft in its bearings, and a cutter or cut-
ters journaled on the eccentric portion of the
shaft, substantially as set forth.

4. In a boiler tube cleaner, a scale-de- 35
tacher comprising a head, a shaft arranged
lengthwise thereon and capable of rotary ad-
justment in its bearings, the body of the
shaft being eccentric to its end-portions and
diminishing in eccentricity toward one end, 40
and a cutter or cutters journaled on the shaft,
substantially as set forth.

5. In a boiler tube cleaner, a scale-de-
tacher comprising a head, a plurality of for-
wardly-converging shafts arranged on said 45
head and capable of rotary adjustment in
their bearings, the body of each shaft being
eccentric to its end-portions and diminishing
in eccentricity toward its front end, and a
pair of cutters journaled on each shaft, the 50
front cutter of each pair tapering forwardly
and the rear one rearwardly and the adjoin-
ing ends of the cutters being of about the
same diameter, substantially as set forth.

Witness my hand this 11th day of April, 55
1907.

ALBERT F. KRAUSE.

Witnesses:

BERTHA KRAUSE,
THEO. L. POPP.