

L. J. GEHL.
FLUE CUTTER.

APPLICATION FILED APR. 29, 1908.

907,987.

Patented Dec. 29, 1908.

2 SHEETS—SHEET 1.

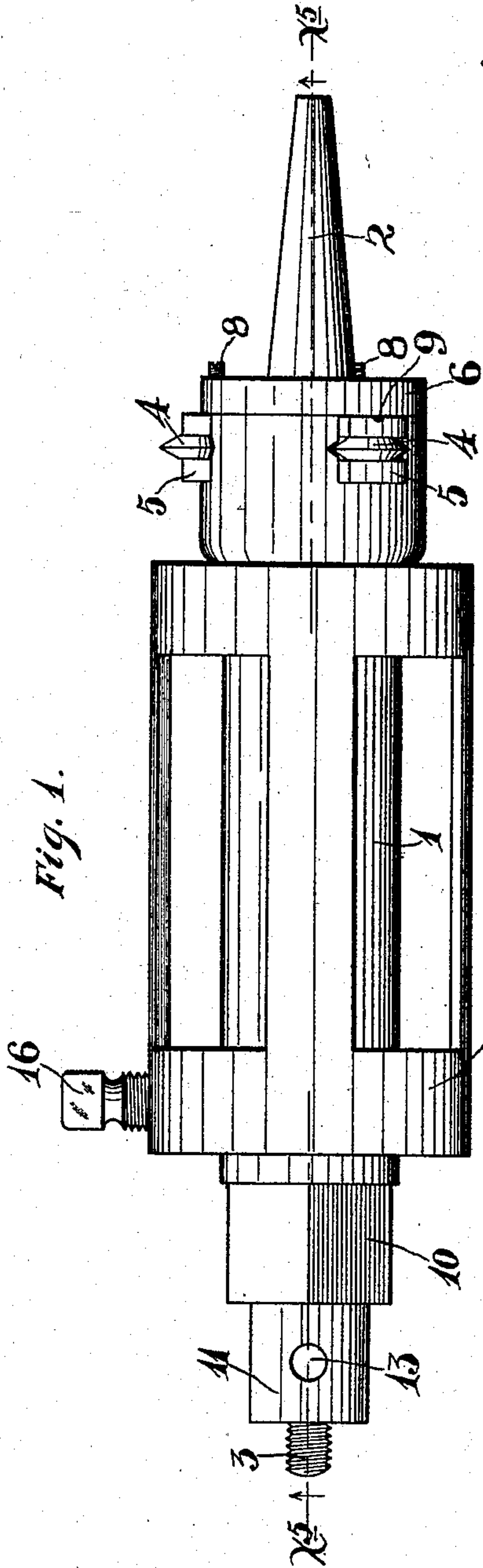


Fig. 1.

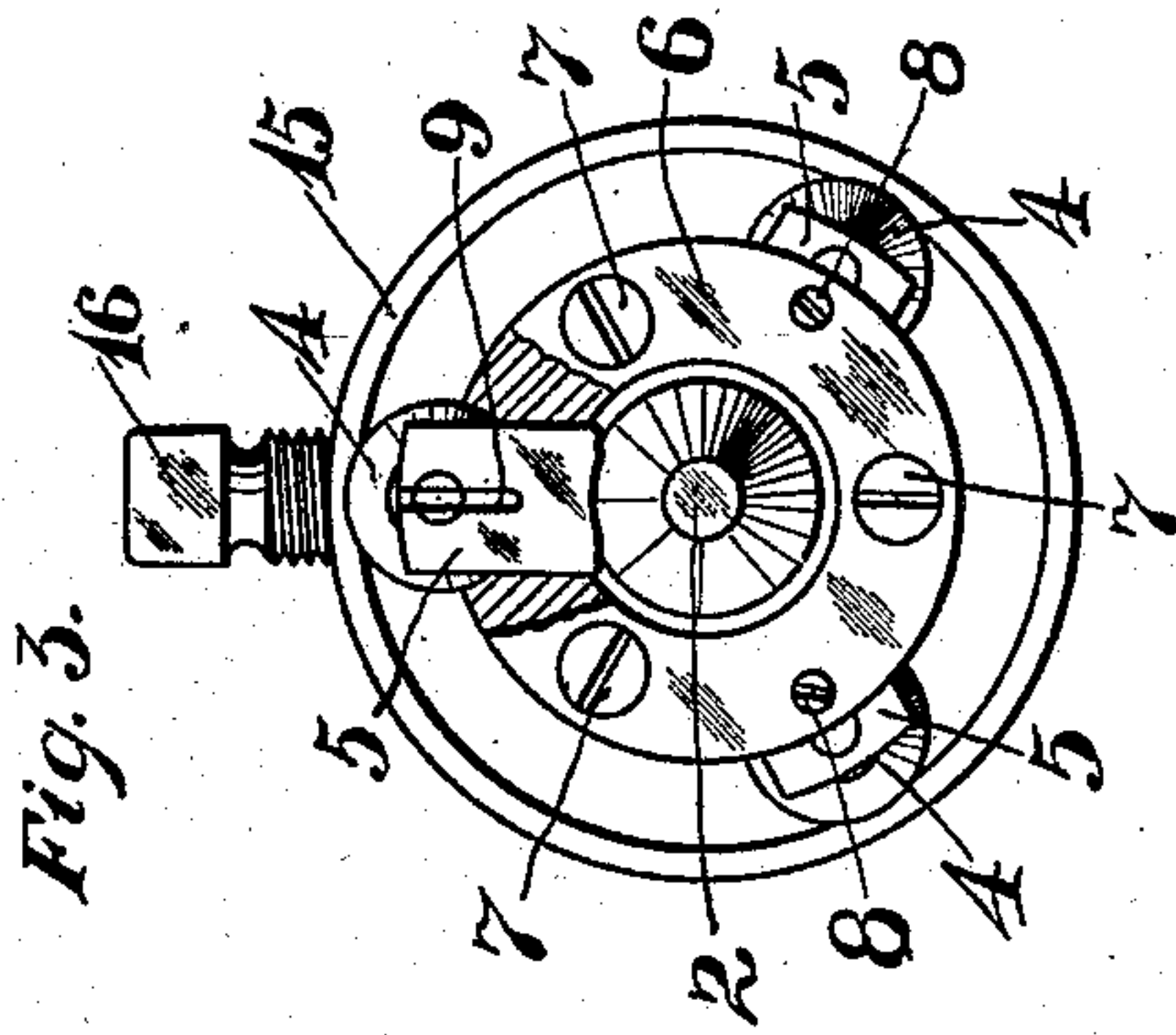


Fig. 3.

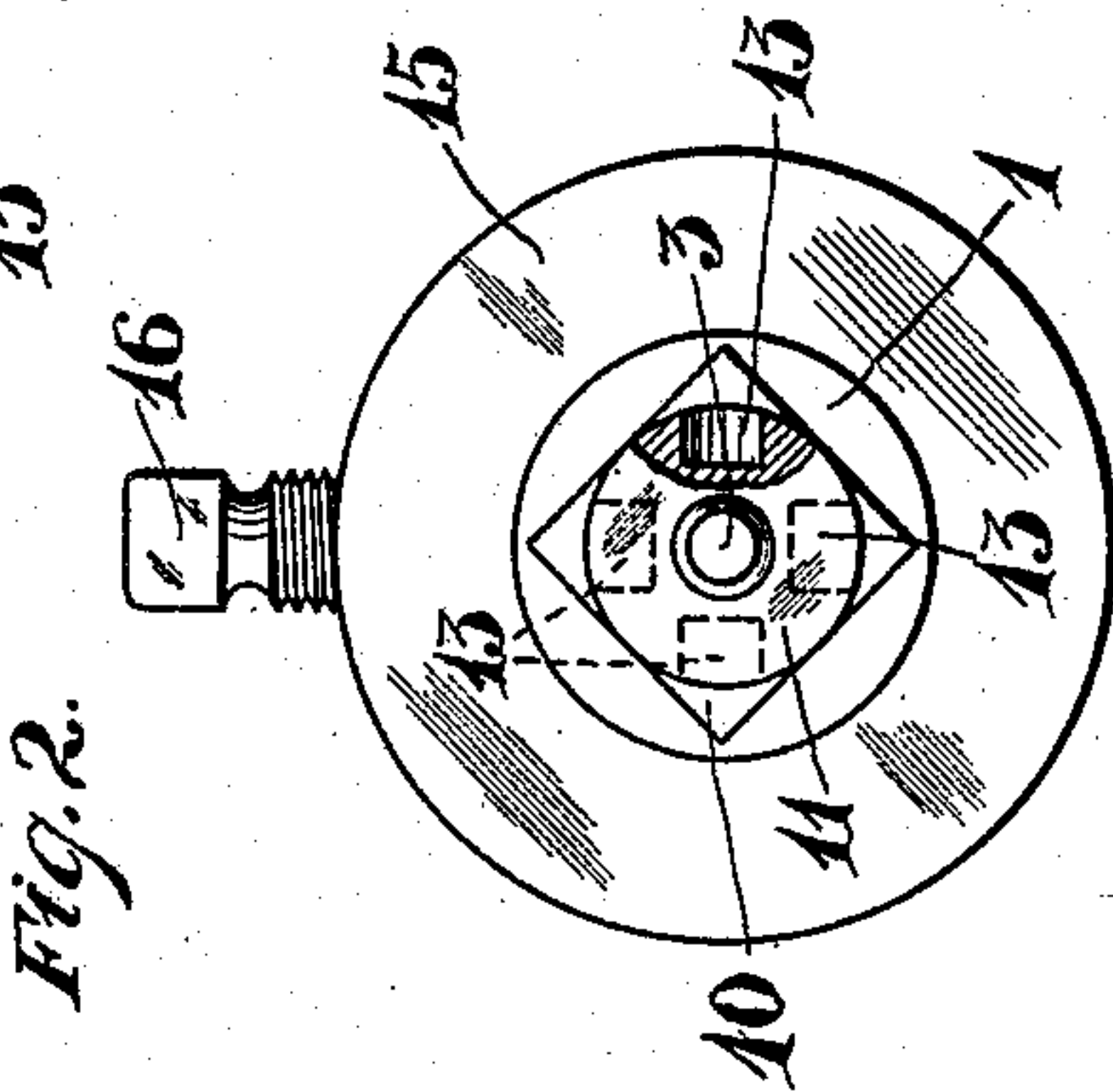


Fig. 2.

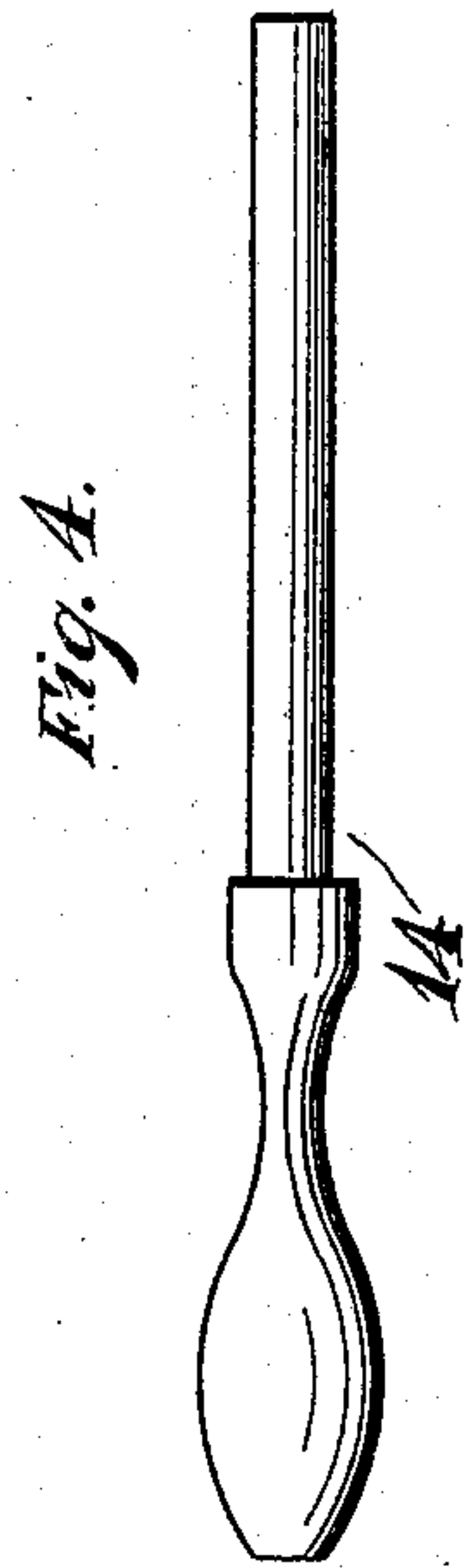


Fig. 4.

Witnesses:

W. H. Souba.
Harry Opsahl

Inventor:

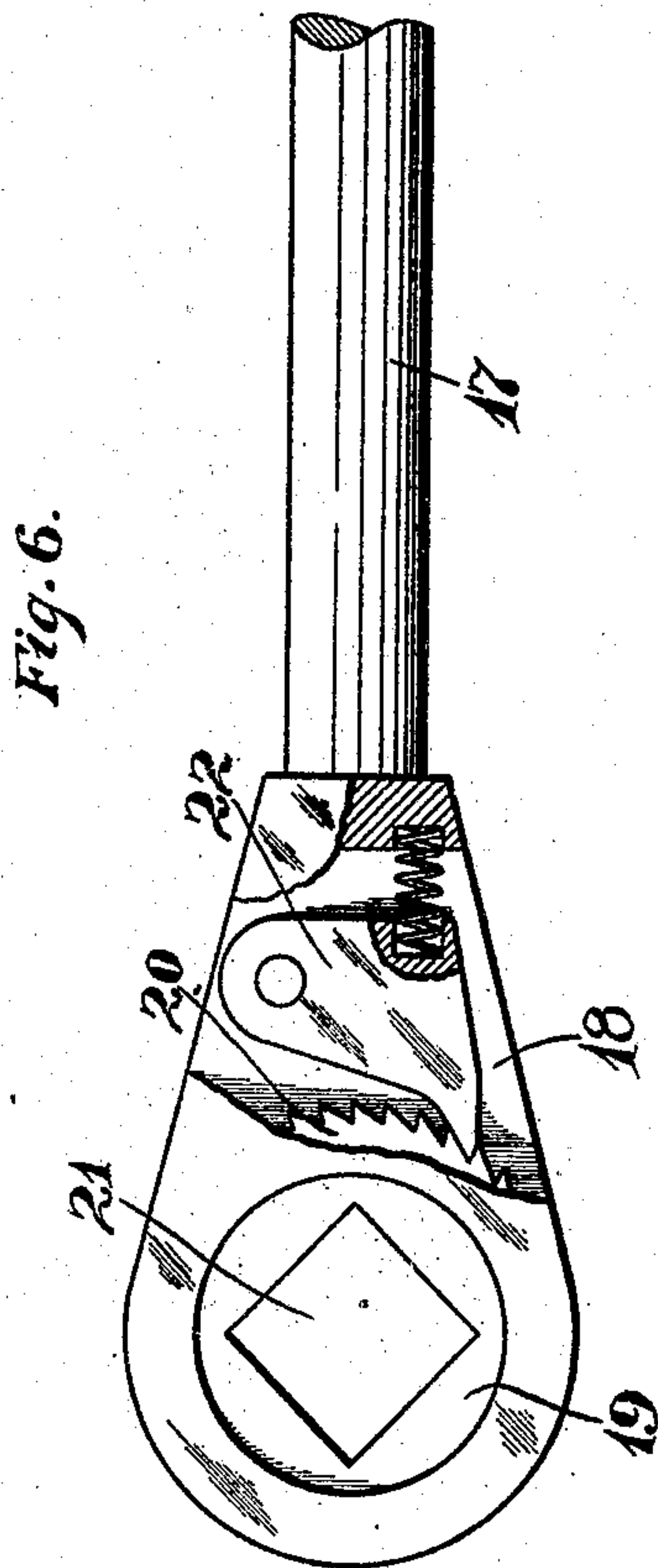
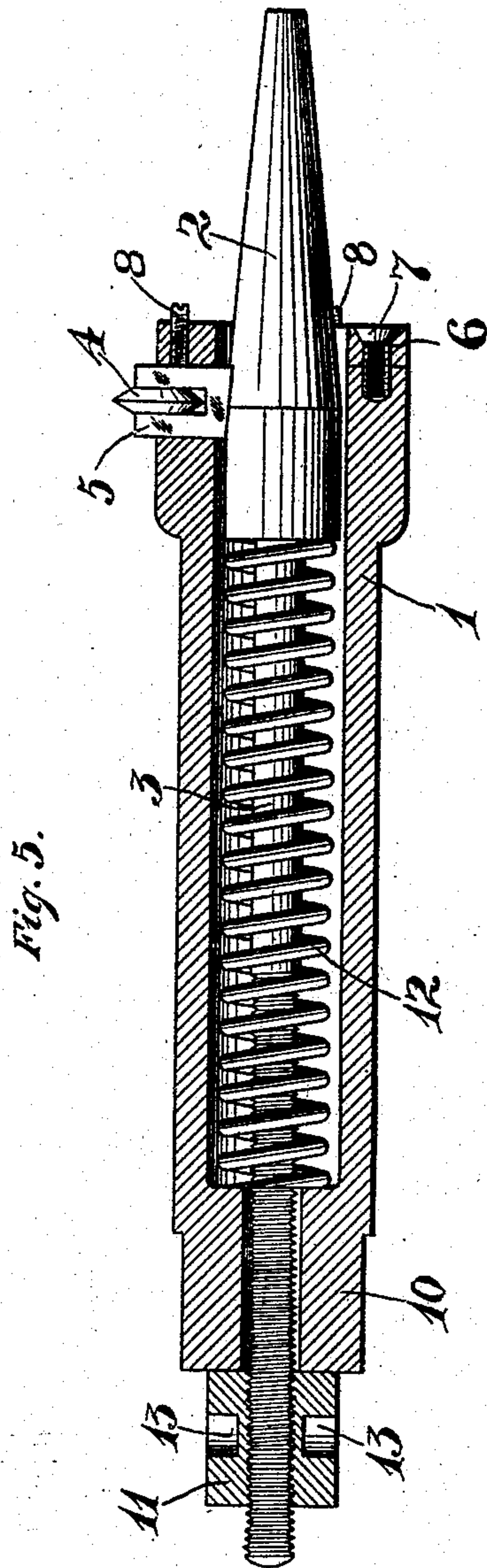
Leonard J. Gehl.
By his Attorneys:
William M. Muehl

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2 SHEETS—SHEET 2.



Witnesses:

W. H. Souba.

Harry Opsahl.

Inventor:

Leonard J. Gehl.

By his Attorneys:

William M. Muchand

UNITED STATES PATENT OFFICE

LEONARD J. GEHL, OF ST. PAUL, MINNESOTA.

FLUE-CUTTER.

No. 907,987.

Specification of Letters Patent.

Patented Dec. 29, 1908.

Application filed April 29, 1908. Serial No. 429,981.

To all whom it may concern:

Be it known that I, LEONARD J. GEHL, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Flue-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.

My invention has for its object to provide an extremely simple and highly efficient flue cutter; and to this end it consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a plan view of the improved flue cutter. Fig. 2 is an elevation looking at the outer end thereof, some parts being broken away. Fig. 3 is an elevation looking at the inner end of the flue cutter. Fig. 4 is a plan view of an operating lever adapted to be used in connection with the flue cutter. Fig. 5 is a section taken on the line $x^5 x^5$ of Fig. 1, some parts being left in full and some parts being removed; and Fig. 6 is a view in elevation, with some parts broken away, showing the ratchet lever for operating the flue cutter.

The flue cutter proper is made up chiefly of a tubular body 1, a tapered mandrel 2 having a stem 3, and sharp edged cutting rollers 4 journaled in bifurcated bearing blocks 5. The bearing blocks 5, of which, as shown, there are three, are mounted in radial seats formed in one end of the tubular body or sleeve 1, and they are preferably held against lateral displacement by a clamping ring 6 secured to the adjacent enlarged or thickened end of the sleeve 1, by means of screws 7. To hold the bearing blocks 5 against displacement, while permitting radial movements thereof, conical pointed retaining screws 8 are seated in the retaining ring 6, with their points engaging longitudinal slots 9 in the said blocks. The inner extremities of the blocks 5 are preferably beveled so as to quite closely fit the tapered mandrel 2, which latter is placed within the sleeve 1 for simultaneous action on the several bearing blocks 5. The projecting end of the mandrel stem 3 is threaded and is projected out-

ward through an axial opening in the squared or angular end 10 of the sleeve 1, and a feed controlling nut 11 works on the projecting threaded portion of the said stem. A strong coiled spring 12 placed within the sleeve 1 reacts against shoulder portions of the said sleeve and mandrel 2 and exerts a force which keeps the nut 11 tightly pressed against the adjacent end of said sleeve. As shown, the nut 11 is provided with radial seats 13 that are adapted to be engaged by the end of a pin-like lever 14, for the purpose of rotating the said nut.

The numeral 15 indicates a gage sleeve that is much larger in diameter than the sleeve 1 and is preferably cut away or made of skeleton form. At one end this gage sleeve 15 is contracted so that it quite closely fits the sleeve 1, and it is provided with a set screw 16 working therethrough and adapted to engage the said sleeve 1 to lock the gage sleeve in any desired position thereon. When this gage sleeve 15 is applied as shown in Fig. 1, it is adapted to engage with the flue sheet of a boiler to determine the location of the cutting wheels 4 in respect to the said flue sheet and the projecting end of the flue. For instance, the said gage sleeve may be so adjusted that the wheels will engage the flue at any desired distance from the flue sheet, either inside or outside of the boiler.

It will, of course, be understood that the spring 12 exerts a force which tends to move the tapered mandrel in a direction to force the bearing blocks 5 and, hence, the cutting wheels 4, radially outward into engagement with the flue. In practice the mandrel is drawn inward against the tension of the spring 12, by means of the nut 11, and after the flue cutter has been inserted within the flue the nut 11 is turned on the threaded end of the stem 3 in the proper direction to permit the spring 12 to force the mandrel 2 axially outward and the rollers radially outward until the latter engage the flue. When the nut 11 is then loosened or moved out of engagement with the adjacent end of the sleeve 1, the spring 12 will serve to automatically force the mandrel 2 axially outward and, hence, to automatically feed the cutting wheels in their cutting action on the flue.

The wheels are caused to cut the flue when the sleeve 1 is rotated; and, while this may be done by any suitable kind of a

lever or handle, I preferably provide a so-called ratchet lever, shown in Fig. 6. This ratchet lever 17 has a bifurcated head 18, in the prongs of which is rotatively mounted
5 a socket member 19 having ratchet teeth 20 and a square seat or perforation 21. The seat 21 is adapted to fit the squared or angular end 10 of the sleeve 1. The ratchet wheels 20 work between the prongs of the
10 bifurcated head 18 and are engaged by a spring-pressed driving pawl or dog 22 mounted in the said head. When this ratchet lever is applied to the shank 10 of the sleeve 1, the latter may be rotated with an in-
15 termittent movement under an oscillatory movement of the said lever 17. This lever is, therefore, adapted to operate the flue cutter when the latter is applied where only a limited lever movement is possible.

20 What I claim is:

1. In a flue cutter, the combination with a sleeve, of a tapered mandrel working therein and having a threaded stem extended without threaded engagement through one
25 end of said sleeve, a nut applied to the threaded end of said stem, a spring surrounding said stem, reacting against said mandrel and against said sleeve and exerting a force which normally holds said nut
30 against the end of said sleeve and forces said

mandrel in the direction in which it is tapered, a multiplicity of wheel bearings seated for radial movements in said sleeve and subject to said tapered mandrel, and cutting wheels journaled in said bearings, whereby
35 the release of said spring is effected by movements of said nut on said stem, and the outward movements of said wheels and their bearings are limited by movements of said nut on said stem, substantially as described. 40

2. In a flue cutter, the combination with a sleeve, of a tapered mandrel working therein and having a threaded stem provided with a nut outside of said sleeve, a spring reacting against said sleeve and against said
45 mandrel, a multiplicity of bearing blocks subject to said mandrel and seated in said sleeve, cutting wheels journaled in said bearing blocks, and pointed retaining screws carried by said sleeve and engaging radial
50 slots in said bearing blocks for limiting the outward radial movements of the latter, substantially as described.

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

LEONARD J. GEHL.

Witnesses:

MALIE HOEL,
F. D. MERCHANT.