

No. 666,284.

Patented Jan. 22, 1901.

G. W. RIDLER.  
FLUE CUTTER.

(Application filed Apr. 9, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

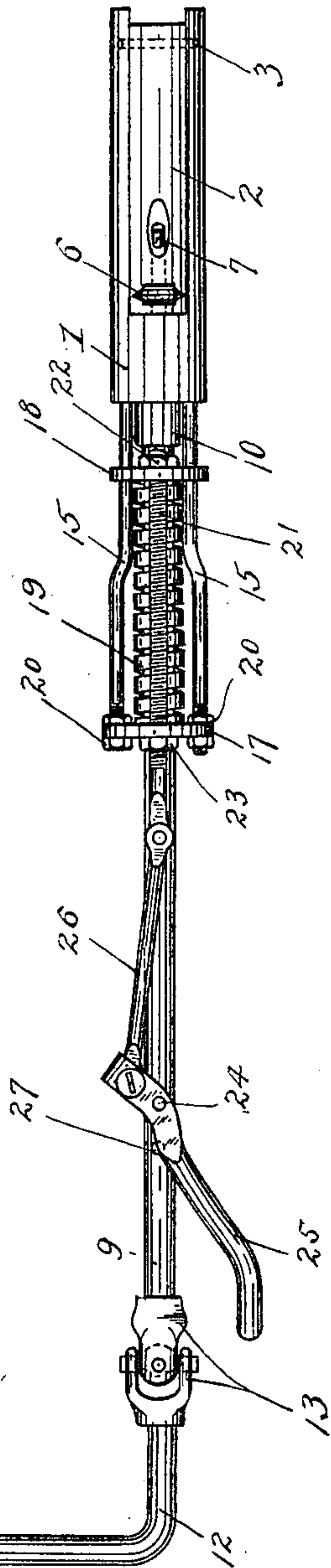


Fig. 2.

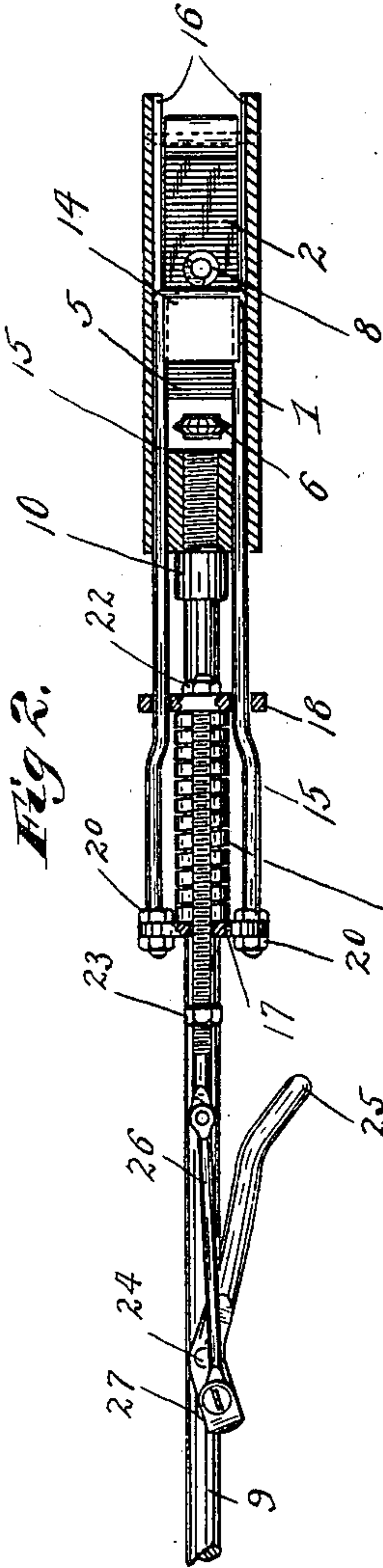
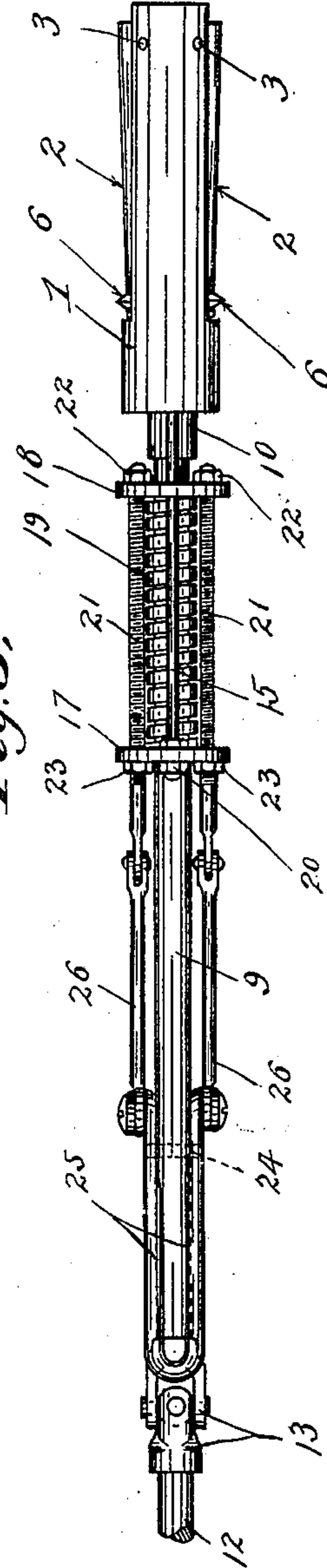


Fig. 3.



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Fig. 4.

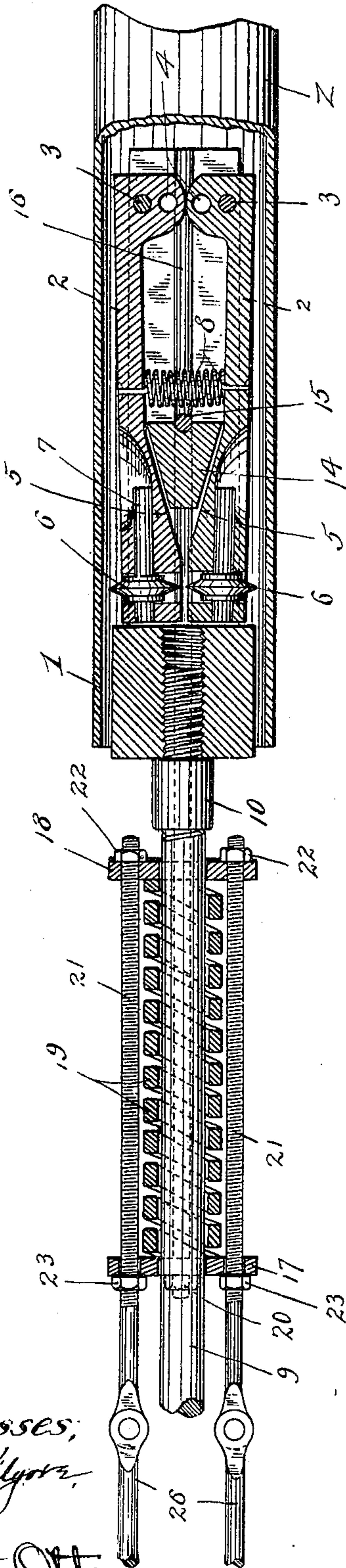
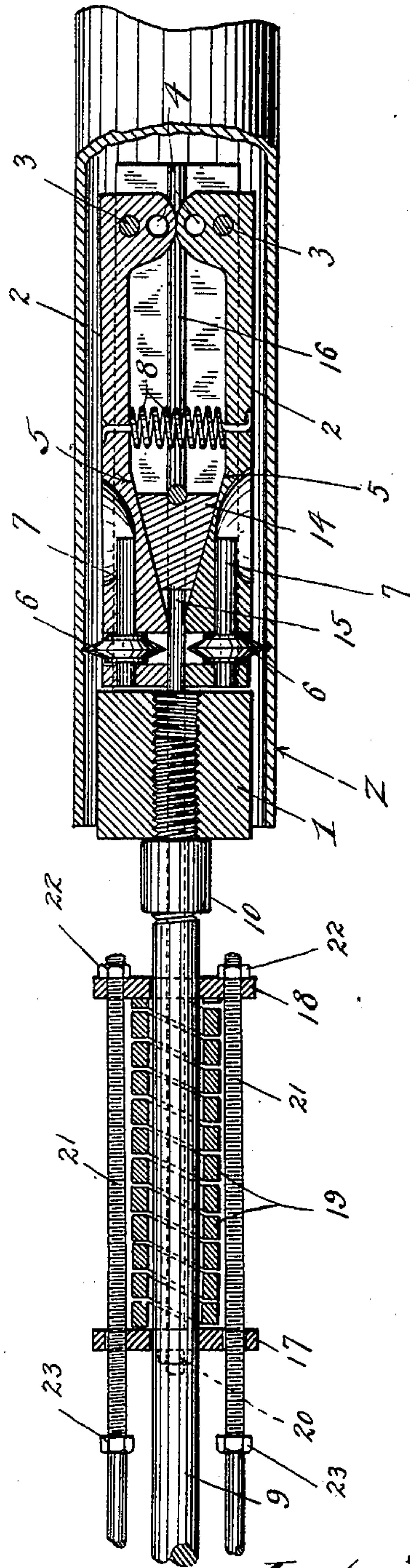


Fig. 5.



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# UNITED STATES PATENT OFFICE.

GEORGE W. RIDLER, OF MINNEAPOLIS, MINNESOTA.

## FLUE-CUTTER.

SPECIFICATION forming part of Letters Patent No. 666,284, dated January 22, 1901.

Application filed April 9, 1900. Serial No. 12,090. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE W. RIDLER, a citizen of the United States, residing at Minneapolis, in the county of Hennepin 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 improved flue or pipe cutter, especially adapted for use by boiler-makers, to cut loose the flues which are to be removed from a boiler. The device is, however, adapted for general use for the purpose of cutting pipes or flues.

To the ends above indicated the invention 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.

Figure 1 is a plan view showing a complete device constructed in accordance with my invention, the cutters being shown as adjusted for insertion into a flue or pipe. Fig. 2 is a similar view to Fig. 1, but with some parts sectioned and others broken away and with the cutters thrown into operative positions. Fig. 3 is a view looking at the device, adjusted as shown in Fig. 1, from an angle of ninety degrees from the direction in which Fig. 1 is seen. Fig. 4 is an enlarged view, partly in section and partly in plan, corresponding in the position of its parts and the direction in which it is viewed Fig. 3; and Fig. 5 is a view corresponding to Fig. 4, illustrating the device with its parts in operative positions.

The body of the device is in the form of a cylindrical block 1, which is bifurcated or cut away completely from one end to a point short of the other end to form a seat in which a pair of jaws 2 are mounted to work. At their inner ends the jaws 2 are pivoted to the prongs of the body 1 by pins 3, that work through one or the other of a pair of perforations 4 in the said ends of the jaws. At their free ends the jaws 2 are provided with diverging cam-surfaces 5, and each has a

hardened cutting-roller 6, which is loosely mounted on a bearing-pin 7, driven longitudinally into suitable seats formed in said jaws. The cutting-rollers 6 project beyond the outer surfaces of the free ends of the jaws 2, so that they are adapted to cut through the body of the surrounding pipe or flue, (indicated in Figs. 4 and 5 by the letter *z*.) A spring 8 yieldingly holds the jaws 2 drawn together or inward, as shown in Figs. 1, 3, and 4, in which positions the rollers are adapted to be slipped, with the device, into the said tube or pipe. A long rod or stem 9 is screwed into the solid outer end of the body 1, a jam-nut or collar 10, as shown, serving to lock the said parts against rotation one with respect to the other. To the outer end of the stem 9 a hand-crank 12 is attached, preferably by means of a knuckle-joint 13. By means of the hand-crank 12 the entire device may be rotated within the tube to which it is applied.

Working between the cam-surfaces 5 of the jaws 2 is a double-faced cam or wedge 14. This cam block or wedge 14 is embraced and adapted to be drawn outward by a long yoke or U-shaped rod 15, the inner portion of which, as shown, works in internal longitudinal grooves 16, cut in the prongs of the body 1.

Sliding on the stem 9 is a pair of followers 17 18, between which a strong coiled spring 19 is compressed, as presently noted. The outer ends of the yoke 15 work loosely through the follower 18 and are secured by nuts 20 or otherwise to the follower 17. A pair of rods 21 in turn work loosely through the follower 17 and are secured by nuts 22 or otherwise to the follower 18. Other nuts 23, that work with screw-threaded engagement on the rods 21, cooperate with the nuts 22 to limit the possible separating movement of the followers 17 and 18.

Pivoted at 24 to the stem 9, outward of the ends of the rods 21, is a bifurcated tension-lever 25, the short pronged ends of which are connected to the corresponding rods 21 by links 26. The lever 25 is adapted to have its pivot shifted on stem 9 from the point 24 to the perforation 27 for a purpose to be hereinafter noted. When the lever 25 stands as shown in Figs. 1 and 3, the roller-bearing



jaws 2 are drawn together and the device is adapted to be inserted into the tube, as already stated and as indicated in Fig. 4. Then by throwing the said lever 25 into the position indicated in Fig. 2 the spring 19 will be compressed and the cam block or wedge 14 will be engaged with the cam-surfaces 5 of the jaws 2 and will yieldingly but with great force press the cutting-rollers upward to their work or into contact with the inner surfaces with the flue or pipe *z*. The tool now being rotated by means of the crank 12 or other suitable device, the rollers will perform the cutting operation and under the tension of the compressed spring 19 will be continuously forced outward until they have completely cut off the tube. Tools for this purpose as hitherto constructed have, so far as I am aware, always employed devices requiring continuous or frequent adjustments to keep the rollers to their work. This device is by a single action put into an operative condition, so that the rollers are thereafter automatically pressed or kept to their work. Even without readjusting the jaws the device will cut flues or pipes varying considerable in diameter; but the range of its work may be considerably extended by placing the pivot-pins 3 in the inner perforations 4 of the said jaws and shifting the pivot for the lever 25 from the point 24 to the point 27.

The device above described is very easily and very quickly applied in working position within a tube or pipe and is readily removed therefrom. It will perform its work very quickly, and as it exerts always an even pressure on the very hard cutting-rollers the said rollers are less frequently broken, and hence will last much longer than in the devices hitherto employed. The device, it will also be understood, is capable of many modifications within the scope of my invention.

The cylindrical block 1, with its prongs, and the outer portions of the jaws 2 form an approximately cylindrical guide which, while it loosely fits within a flue or pipe, serves to guide the rollers to their work and to prevent lateral strains from being thrown upon them in the cutting action. For this reason also the cutting-rollers are located quite near to the outer end of the said block 1, so that the inner end of the said block will have a longer leverage within the tube to prevent such lateral movements of the rollers.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a flue-cutter, the combination with radially-movable cutters, of a yielding tension device for pressing said rollers to their work, means for throwing said tension device in and out of action, and means for causing said rollers to travel over the surface of the tube, substantially as described.

2. In a flue-cutter, the combination with a head and means for rotating the same, of jaws pivoted for radial movements on said head and provided with cutting-rollers at their free ends, the cam-block acting upon said jaws to press the same outward, a spring forcing said cam-block to its work, and lever-operated connections for rendering the said spring operative and inoperative on said cam-block, at will, substantially as described.

3. In a flue-cutter, the combination with a head or block and means for rotating the same, of the pair of jaws pivoted to said rotary head and provided at their free ends with diverging cam-surfaces and aligned cutting-rollers, a cam-block operating on said cam-surfaces to press said cutting-rollers to their work, a spring compressed between followers, a pair of tension-rods having stops against which said followers are normally pressed, connections from one of said followers to said cam-block, and a tension-lever having connections to said pair of tension-rods and operating thereon to throw the tension of said spring onto the said cam-block, substantially as described.

4. The combination with the bifurcated head 1, having the stem 9 and devices for rotating the same, of the pivoted jaws 2 with cam-surfaces 5 and cutting-rollers 6, the followers 17, 18, on the stem 9, the rods 21 having the stops 22, 23, the springs 19 normally pressing said followers against said stops 22, 23, the bolt or rods 15 connecting said follower 17 to the cam-block 14, and the lever 25 with the link connections 26 to said rods 21, operating to throw the tension of the spring 19 onto said cam-blocks 14, substantially as described.

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

GEORGE W. RIDLER.

Witnesses:

M. M. McGRARY,  
F. D. MERCHANT.