(No Model.)

2 Sheets—Sheet 1.

J. O. LEE.

FLUE CUTTER.

No. 303,524. Patented Aug. 12, 1884.

Fig. 1.

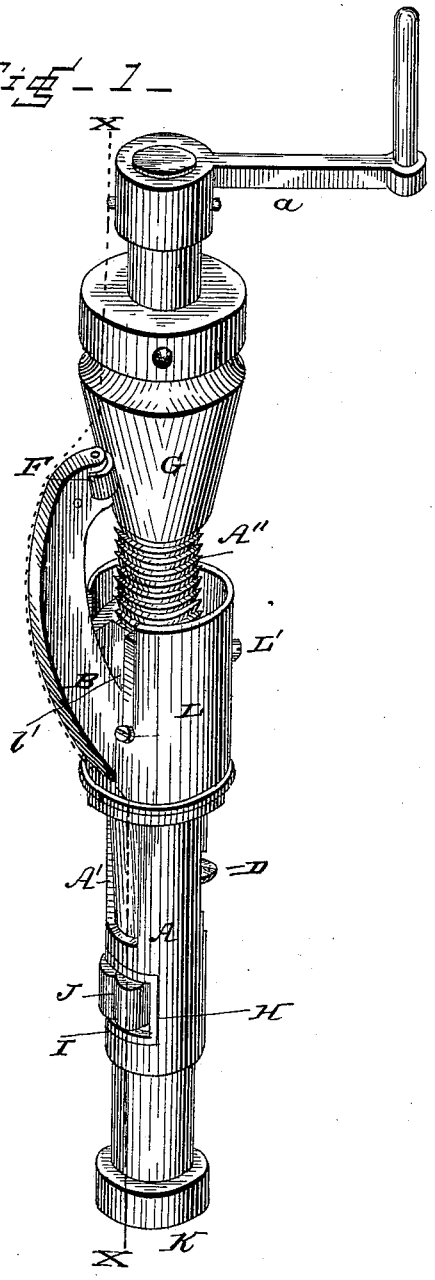
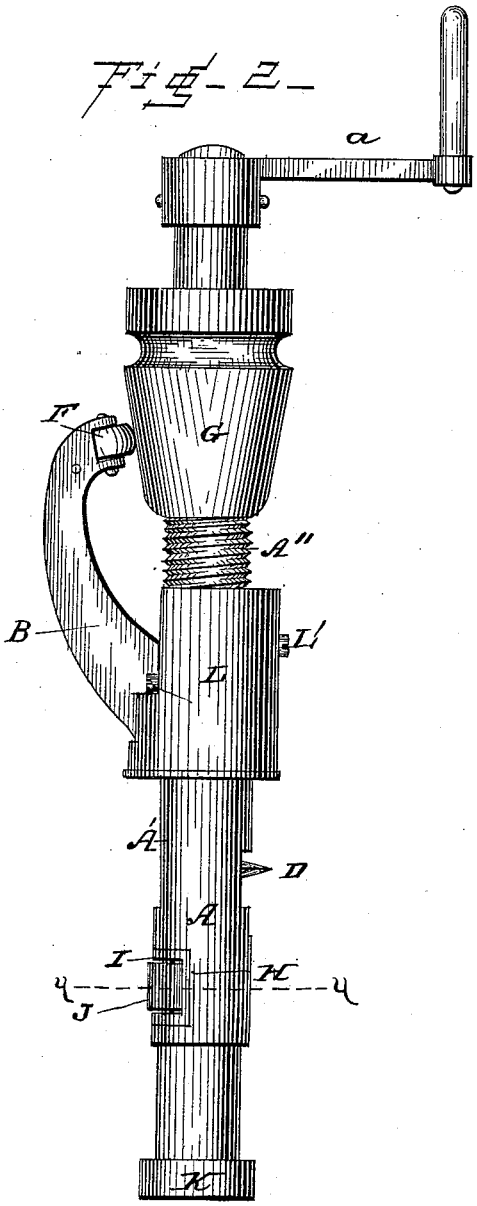


Fig. 2.



WITNESSES:

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(No Model.) 2 Sheets—Sheet 2.

J. O. LEE.

FLUE CUTTER.

No. 303,524. Patented Aug. 12, 1884.

Fig. 3.

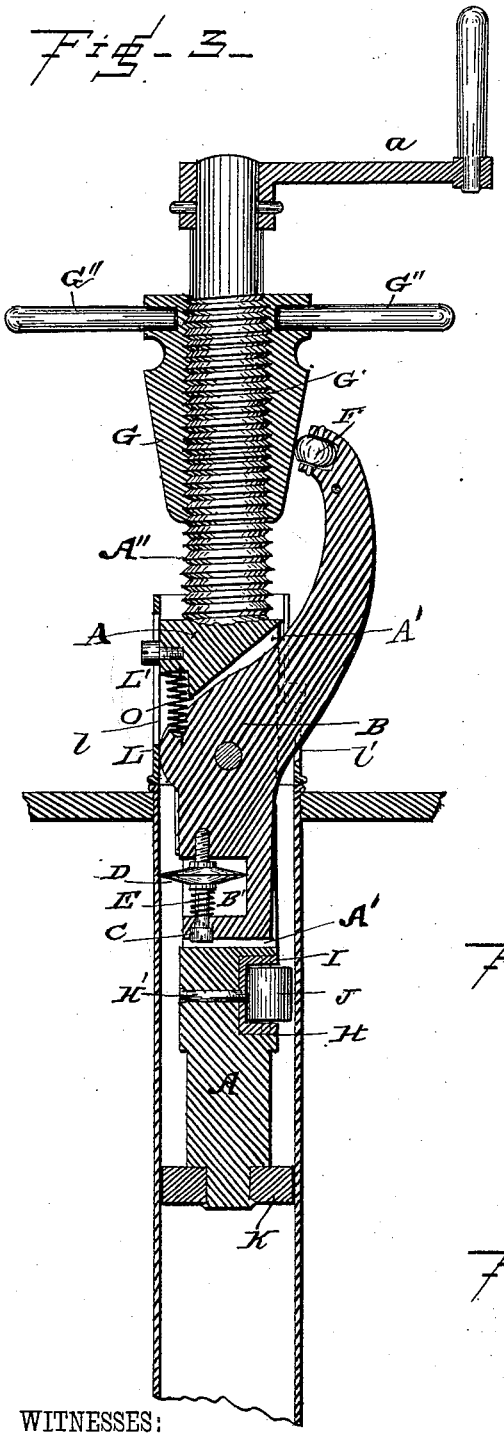


Fig. 4.

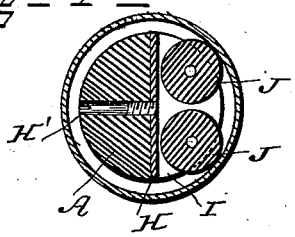


Fig. 5.

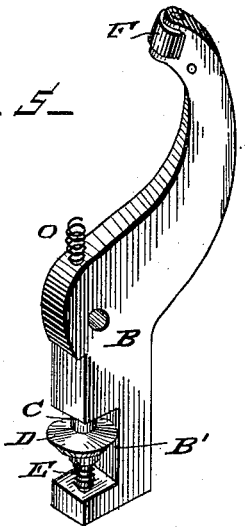


Fig. 6.

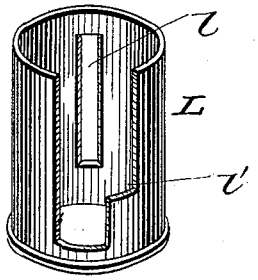
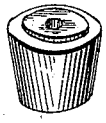


Fig. 7.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN O. LEE, OF ST. PAUL, MINNESOTA.

FLUE-CUTTER.

SPECIFICATION forming part of Letters Patent No. 303,524, dated August 12, 1884.

Application filed April 12, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN O. LEE, a citizen of the United States, and a resident of 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 that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a perspective view of my improved flue-cutter. Fig. 2 is a side view of the same. Fig. 3 is a longitudinal sectional view on line *x x*, Fig. 1. Fig. 4 is a cross-sectional view taken on line *y y*, Fig. 2. Fig. 5 is a perspective detail view of the pivoted arm which carries the cutter-blade. Fig. 6 is a perspective detail view of the adjusting-sleeve, which will be hereinafter described; and Fig. 7 is a perspective detail view of the expansion-roller.

Similar letters of reference indicate corresponding parts in all the figures.

My invention relates to devices for cutting out the worn tubes of steam-boilers, &c.; and it consists in the improved construction and combination of parts of the same, as will be hereinafter more fully described and claimed.

In the accompanying drawings, A represents the stock or body portion of my improved flue-cutter, which is slotted longitudinally at A′, and has on that portion of it which in the following description I shall denominate the "upper" end, an exterior screw-thread, A,″ for the purpose hereinafter specified. Within this longitudinal recess A′ is pivoted, at about its center, a lever or arm, B, which is shown in detail in Fig. 5 of the drawings. This arm B is provided near its lower end with a recess, B′, within which is secured by means of a bolt or screw, C, the revolving cutter D, a spiral spring, E, surrounding the screw C between the lower jaw of the recess B′ and the lower side of the said cutter, for the purpose hereinafter described. In the upper inwardly-curved end of the arm B is a suitable anti-friction roller, F.

G represents the conical adjusting and feeding block, which is provided with an interior female screw-thread, G′, to adapt it to fit and move upon the screw-threaded end of the stock A. The lower portion of the stock A below the recess A′ is recessed on one side at H for the reception of a journal-box, I, (held in position by means of a suitable screw, H′,) within which are journaled the anti-friction rollers J, while upon the lower end of the stock is pivotally secured another anti-friction roller, K, the anti-friction rollers J and K serving to reduce friction against the inside of the flue while the cutter is being operated.

L is a sleeve, the inner end of which is adapted to bear against the end of the flue, and the said sleeve has a slot, *l*, through which passes a set-screw, L′, the sleeve sliding with the slot upon the screw, while the curved arm B projects through a slot, *l′*, diametrically opposite to it. It will be seen that the sleeve sliding adjustably upon the stock, the set-screw passing into the stock, and the inner end of the sleeve bearing against the end of the flue, the distance from the edge of the flue to the place where it is to be cut may be regulated by sliding and adjusting the sleeve.

The manner in which my improved flue-cutter operates is as follows: The sleeve L is first adjusted to regulate the distance within the boiler-head or outside of the boiler-head at which the flue is to be cut off. The lower end of the cutter is then slid within the flue as far as the sleeve L will permit, when the conical block G is screwed down upon the upper portion of the stock A by means of its handle G″, thereby gradually forcing out the upper end of the pivoted arm B until the cutter D, in the lower end of the said arm, comes in contact with the inside of the flue being operated upon. The entire cutter is then rotated or revolved by means of its handle *a*, the cutter-blade D being fed out or moved out as required by turning down still farther the conical block G until the tube is cut entirely through, when, by retracting the said conical block, the cutter may be removed from the boiler.

The spiral spring E allows the revolving cutter-blade a certain amount of up-and-down motion on the screw C, and serves to hold it true within the groove which it first cuts.

The anti-friction rollers F, J, and K serve

to reduce friction at the various points where they are attached.

In placing new tubes or flues in a boiler the cutter-blade D may be removed, and the expansion-roller shown in Fig. 7 substituted for it, when, by operating the various parts in the manner previously described, the flue may be expanded to any desired extent.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of my improved flue-cutter will readily be understood without requiring further explanation.

A spring, O, serves to hold the upper end of the pivoted arm B, in which the anti-friction roller F is journaled, firmly against the adjusting-face of the conical block G.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In combination with the stock A and conical adjusting-block G, the pivoted arm B, having at its upper end an anti-friction roller and at its lower end a recess, B′, cutter-blade D, secured upon a screw or bolt, C, within the said recess, and a spiral spring, E, surrounding the screw C between the lower jaw of the recess B′ and the lower side of the cutter-blade, as shown and described.

2. The combination of the stock A, provided with a longitudinal slot, A′, and anti-friction rollers J and K, pivoted arm B, having at its upper end an anti-friction roller, F, and at its lower end a cutter-blade, D, adjusting-sleeve L, and conical adjusting and feeding-block G, all constructed and arranged to operate substantially in the manner and for the purpose shown and described.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

JOHN O. LEE.

Witnesses:
J. P. ALLEN,
JOHN NEFF.