(No Model.)

J. N. MURRAY.

COMBINED EXPANDER AND FLUE CUTTER.

No. 426,044. Patented Apr. 22, 1890.

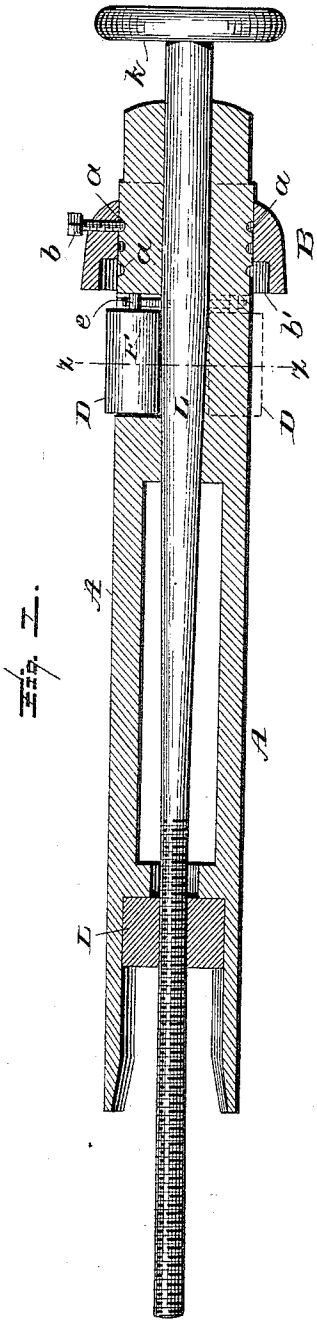


Fig. 1.

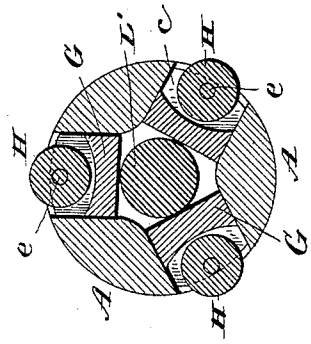


Fig. 3.

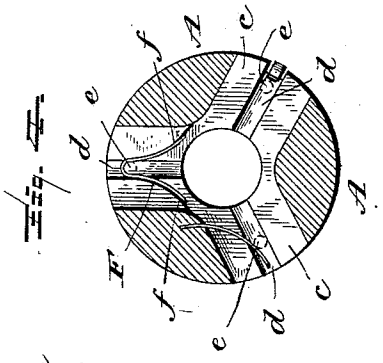


Fig. 4.

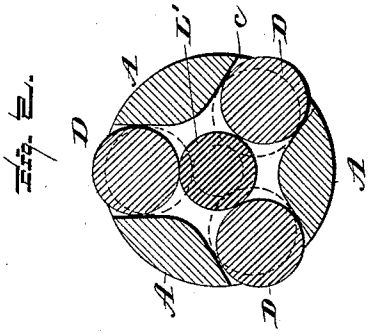


Fig. 2.

Witnesses
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By his Attorney
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN NICHOL MURRAY, OF SAULT STE. MARIE, MICHIGAN, ASSIGNOR OF ONE-HALF TO JOSEPH STANLEY BURCHILL, OF SAME PLACE.

COMBINED EXPANDER AND FLUE-CUTTER.

SPECIFICATION forming part of Letters Patent No. 426,044, dated April 22, 1890.

Application filed January 16, 1890. Serial No. 337,041. (No model.)

To all whom it may concern:

Be it known that I, JOHN NICHOL MURRAY, a citizen of the United States, residing at Sault Ste. Marie, in the county of Chippewa and State of Michigan, have invented certain new and useful Improvements in a Combined Expander and Flue-Cutter; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters of reference marked thereon.

This invention relates to certain new and useful improvements in flue-expanders; and it has for its object to provide a combined flue-cutter and expander wherein the parts are interchangeable, so that cutters may be readily substituted for expanders in the same device, the other parts remaining the same and requiring no change. I provide a suitable shell with recesses to receive the cutters and expanders, cutting the flue from the inside by means of a preferably-circular knife, and expand the flue by screw-pressure. I hold the cutters and knives in their recesses or sockets by means of springs, which allow the cutters or knives to move outward as much as necessary to expand or cut, but drawing them back to place within their recesses or sockets when the pressure is relaxed.

Other objects and advantages of the invention will hereinafter be made apparent, and the novel features thereof will be specifically pointed out in the appended claim.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a longitudinal section through my improved device. Fig. 2 is a cross-section on the line *z z* of Fig. 1, showing the expanders or rollers in place. Fig. 3 is a like section showing the cutters substituted for the rollers. Fig. 4 is a cross-section through the shell or stock, showing the recesses or sockets for the rollers and knives, with the different forms of springs which I sometimes employ to hold the same in place.

Like letters of reference indicate like parts throughout the several views.

Referring now to the details of the drawings by letter, A designates the shell or stock, of suitable material and length, provided at its outer end with a plurality of annular grooves *a*, in which the set-screw *b* is designed to engage to secure in position thereon the rim B, provided at its forward end with a recess *b'*, as shown in Fig. 1. These grooves and set-screw allow of the rotary movement of the rim on the stock, but prevent longitudinal movement thereof thereon. By moving the rim longitudinally on the stock or shell the rollers hereinafter described can be adjusted to different depths in the flue. This rim is designed to rest against the crown-sheet of the boiler. Near the outer end this stock or shell is formed with a plurality of recesses or sockets *c*, extended longitudinally of the shell, and in these recesses or sockets the rollers or knives are designed to be seated. The opposite end walls of these recesses are provided with radial grooves *d*, into which the pintles of the rollers are designed to be placed. These rollers D extend longitudinally or lengthwise of the stock or shell and have pintles *e*, which are seated in the radial grooves in the recesses. They are retained in place by springs, which may be of either of the forms shown in Fig. 4, all acting on the same principle and in the same way. In said Fig. 4, F is a substantially U-shaped spring, the bend in which is designed to bear against the outer side of the pintle of the roller, the outwardly-bent arms of the spring bearing against curved walls *f* in the recesses, as seen at the upper part of Fig. 4. As the rollers are forced outward by the screw-pressure hereinafter described, the springs are compressed and the rollers allowed to move outward under the influence of the pressure; but when the pressure is relaxed the springs force the rollers inward to their normal positions.

At the left-hand side of Fig. 4 is shown another form of spring, which, instead of being U-shaped, is simply a flat spring, with one end secured in the shell and the other end extended across the groove in the path of the pintle of the roller, as shown at the left of said figure. This acts in the same way as the U-shaped spring above described.

At the right of Fig. 4 there is shown another form of spring, which is simply a flat spring arranged lengthwise of the stock or shell, with its end bent downward into the groove of the recess and acting against the end of the pintle of the roller.

G are flat blocks adapted to fit the recesses in the stock and carrying circular cutters H, as seen best in Fig. 3, the said cutters extended at right angles to the length of the stock or shell, as shown in said Fig. 3. These blocks may be held in their recesses by means of any of the forms of springs shown in Fig. 4.

The rollers or knives are forced outward in the following manner: L′ is a tapered screw-threaded rod passed through an opening in the stock or shell and provided with a hand-wheel or other analogous device *k*, by which it is turned. The threaded portion of this rod engages a nut L at the inner end of the stock, as shown in Fig. 1. By turning upon the rod the same is forced inward by reason of its engagement with the said nut, and the rollers or cutters, as the case may be, are forced outward and cut or expand the flue.

The rollers may be readily taken out and replaced by the knives, or vice versa.

What I claim as new is—

The combination, with the stock having longitudinal apertures provided with radial grooves, of V-shaped springs arranged in the recesses with portions engaging the pintles of rollers and with their ends bearing against curved walls in the recesses, and the rollers having pintles working in the grooves in the recesses and held in the bights of the springs, as set forth.

In testimony that I claim the above I have hereunto subscribed my name, in the presence of two witnesses, this 16th day of December, A. D. 1889.

JOHN NICHOL MURRAY.

Witnesses:
C. W. DUNTON,
JAY W. SUTTON.