

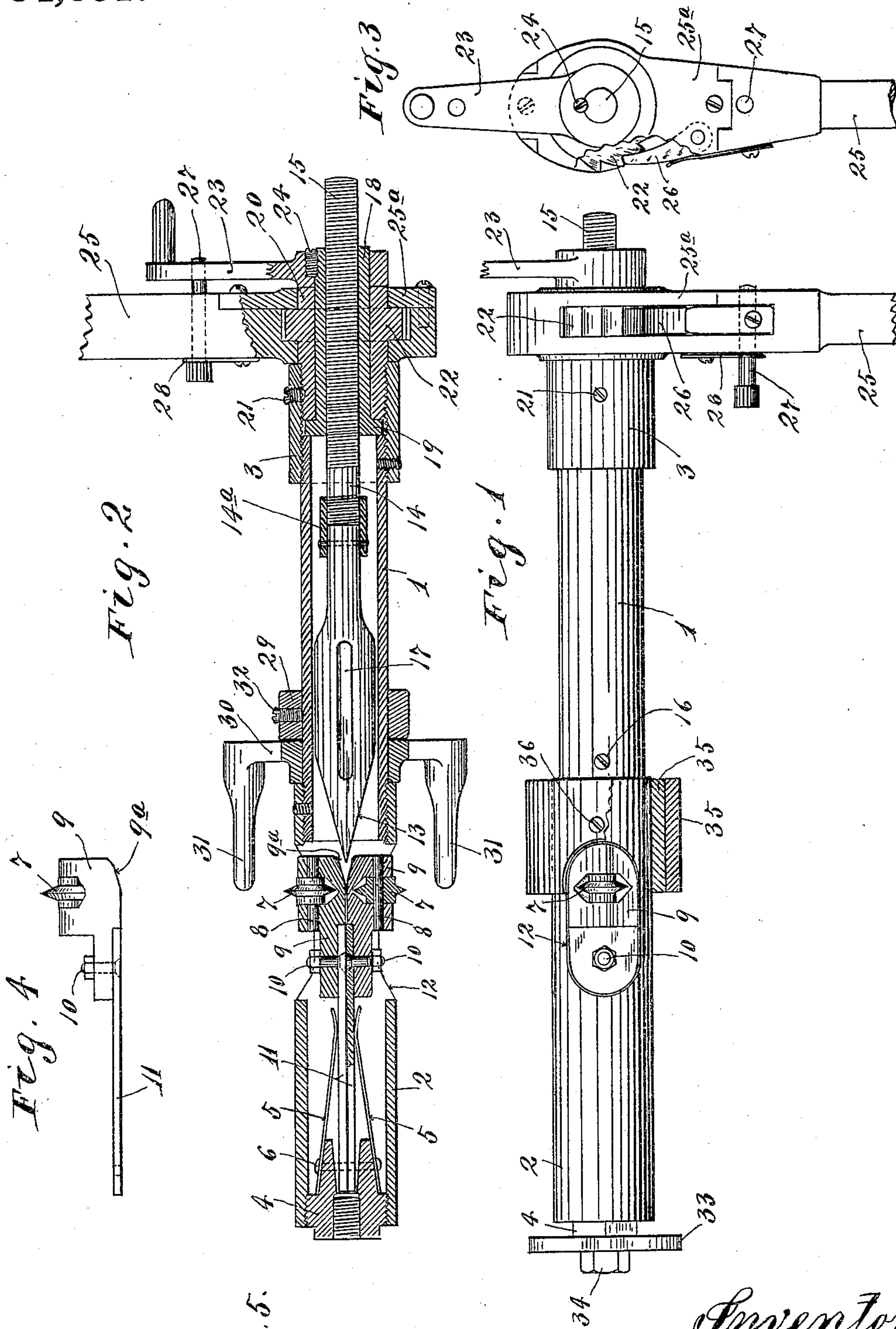
E. M. POPE & I. J. B. HANTEN.

FLUE CUTTER.

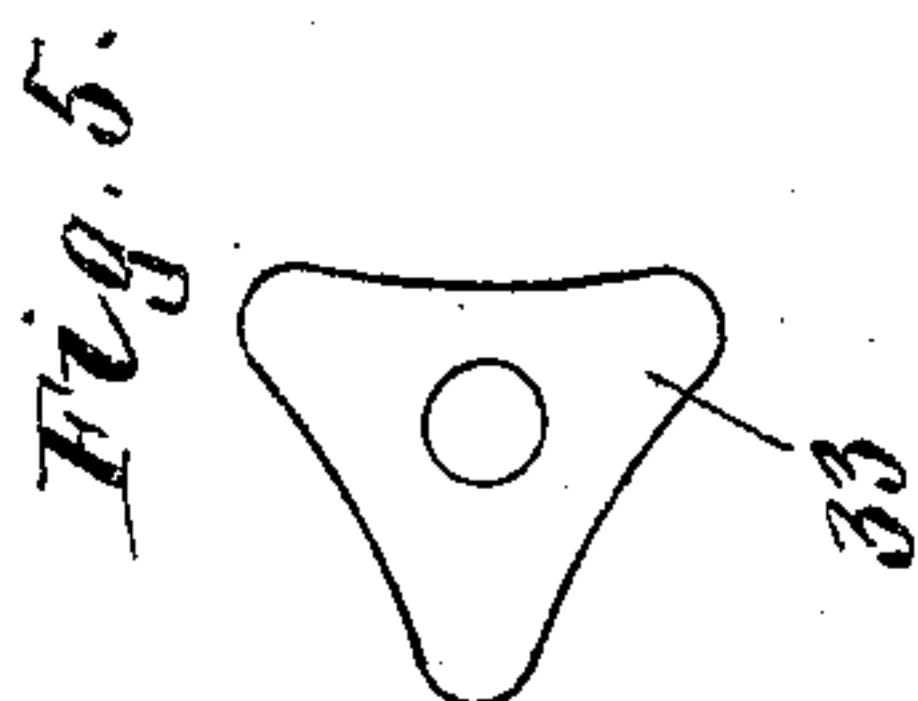
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UNITED STATES PATENT OFFICE.

EDWARD M. POPE AND ISIDOR J. B. HANTEN, OF WATERTOWN, SOUTH DAKOTA.

FLUE-CUTTER.

934,351.

Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed March 29, 1909. Serial No. 486,636.

To all whom it may concern:

Be it known that we, EDWARD M. POPE and ISIDOR J. B. HANTEN, citizens of the United States, residing at Watertown, in the county of Codington and State of South Dakota, have invented certain new and useful Improvements in Flue-Cutters; and we 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.

This invention has for its object to provide an improved flue cutter, and to this end it consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

This invention was especially designed as an improvement on the flue cutter disclosed and claimed in Letters Patent of the United States No. 643,961, issued of date February 20, 1900, to Isidor J. B. Hanten and John J. Kranz.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a plan view, with some parts broken away, showing the improved flue cutter; Fig. 2 is a horizontal section taken centrally and longitudinally through the flue cutter, some parts being shown in full and some parts being broken away; Fig. 3 is an elevation looking at the outer end of the flue cutter, some parts being broken away; Fig. 4 is a detail view in plan, showing one of the cutting wheels, its bearing block and supporting arm; and Fig. 5 is a detail in elevation, showing one of the so-called centering heads adapted to be applied to the inner end of the body of the flue cutter.

The body of the flue cutter, as shown, is made up of a pair of tubes 1 and 2 and a collar 3, which parts are rigidly but detachably connected by threaded engagements. A bearing plug 4 is screwed into the projecting end of the tube 2 and is provided with inwardly projecting laterally spaced lugs, to which a pair of opposing leaf springs 5 are secured by rivets 6.

The sharp edged cutting wheels 7 are, by suitable pins 8, journaled to so-called bearing blocks 9, which, in turn, are rigidly but detachably connected by short nutted bolts 10 to the free ends of supporting arms or bars 11. The extended ends of the arms

11 are loosely mounted on the intermediate portion of the rivet 6 between the laterally spaced bearing lugs of the plug 4 and normally they are yieldingly held together and in a central position within the tube 2, by the opposing springs 5. At diametrically opposite points, the tube 2 is cut away, as shown at 12, to afford clearance for the bearing blocks 9.

At their opposing free edged portions, the bearing blocks 9 are provided with diverging cam surfaces 9^a that are adapted to be engaged by a wedge 13 shown as detachably secured, by a threaded coupling sleeve 14^a, to a stem 14 which has a threaded end 15. The body portion of said wedge 13 quite closely fits but works freely within the tube 1 and is held against rotation, as shown, by a small screw 16, the inner end of which engages a longitudinal groove 17 of the said stem. The slot 17 permits free endwise movements of the wedge 13. The threaded outwardly extended end 15 of the stem 14 has threaded engagement with a sleeve 18, the flanged inner end 19 of which is located within the collar 3 and adjacent to the outer end of the tube 1. Loosely mounted on the sleeve 18 is another sleeve 20, which has threaded engagement with the collar 3 and is positively locked against rotation in respect thereto by a small set screw 21. This collar 20 is provided with a ratchet wheel 22 on its projecting portion. A so-called feed lever 23 is rigidly secured, as shown, by a lock screw 24, to the outwardly projecting end of the collar 18.

A main operating lever 25 is loosely mounted on the sleeve 20 and is bifurcated so that it embraces the ratchet wheel 22. As shown, the said lever 25 is provided with a detachable side plate 25^a, which makes its application to the sleeve 20 on opposite sides of the ratchet wheel 22 an easy matter when, of course, the said sleeve is removed from the collar 3.

The lever 25 carries a spring pressed pawl 26 that operates upon teeth of the ratchet wheel 22. The feed lever 23 is adapted to be locked to the said lever 25, at will, by means of a lock bolt or pin 27 which is slidably mounted in said lever 25 and is engageable with a perforation or seat in said lever 23. As shown, a leaf spring 28, applied to the lever 25, frictionally holds the lock bolt 27 either in its inoperative position, as shown in Fig. 1, or in its operative posi-

tion, as shown in Fig. 2. The said spring 28 simply presses frictionally against one side of the said lock bolt 27.

Loosely mounted on the body tube 1, between the end of the tube 2 and a gaged collar 29, is a gage bracket 30 having a multiplicity of projecting fingers 31 adapted to engage the flue sheet and thereby properly position the cutting wheels 7 within the flue. The collar 29 is made adjustable on the tube 1 by means of a set screw 32 and, hence, may be set so as to cause the cutting wheels 7 to cut the flue at any one of several points; or, in other words, at any desired distance from the flue sheet. The tube 2, will, of course, be inserted into a flue that is to be cut, and when it is inserted, the cutting wheels 7 will lie nearly or quite within the outer circumference of said tube 2.

To adapt the flue cutter for use in flues of different diameters, centering heads 33 of different sizes, are provided, and a centering head of proper size to fit the particular flue, is adapted to be pivotally secured to the bearing plug 4 by a machine screw 34. Preferably these centering heads are provided each with three arms or projections, or in other words, are approximately triangular in form. For the same purpose, and for co-operation with the centering head 33, one or more centering rings or bushings 35 are detachably applied around the outer end portion of the tube 2.

As shown in Fig. 1, a centering head and two concentric centering rings or bushings 35 are applied to the tool, and the said rings are connected together and are detachably secured to the tube 2 by a set screw 36. At diametrically opposite points, the centering rings 35 are notched or cut away to afford clearance for the roller bearing blocks 9.

By reference to Fig. 1, it will be further noted, that the notched edges of the centering rings 35 extend toward the inner end of the tool, slightly beyond the cutting plane of the wheels 7. This is important because by such arrangement, the centering rings are caused to hold the inner portion of the flue that is being cut, in proper position until it has been entirely cut off. Also for cutting flues of different diameter, bearing blocks 9, of different thickness, should be provided, so that the cutting wheels 7 will be carried outward in the tube openings 12 a distance corresponding to the diameter of the centering head 33 and outer centering ring 35. For instance, the bearing block, shown in Fig. 4, is adapted for use in connection with the centering head and rings applied as shown in Fig. 1, and, consequently, is much thicker than the bearing blocks 9, shown in Fig. 2.

As shown in Fig. 2, the bearing blocks 9 normally are pressed directly together and the cutting wheels 7 are arranged to work in

seats that are cut nearly through the said bearing blocks. This, as is evident, permits of the greatest possible contraction of the cutting tools, and, in a tool for cutting a flue of a determined minimum size, it permits the use of cutting wheels of the largest possible diameter.

As is evident, when the wedge 13 is forced into engagement with the diverging cam surfaces 9^a of the bearing blocks 9 and is then forced between the bearing blocks, the said bearing blocks will be operated and the cutting wheels moved radially outward in diametrically opposite directions. This, of course, is the action required in cutting a flue. The said wedge 13 is thus forced between the bearing blocks by a rotation of the nut acting sleeve 18, in respect to the body of the flue cutter, or conversely by rotation of the body of the flue cutter in respect to the said sleeve 18. By oscillation of the main operating lever 25, the body of the flue cutter will be rotated in a constant direction and the cutting wheels 7 will be caused to travel against the inner surface of the flue. The feed movement of the wedge 13 may be produced intermittently and at will, by moving the lever 23 at intervals while the tool is being rotated by oscillations of the lever 25; or, this feed movement of the wedge will be produced in a sense automatically by locking the two levers 23 and 25 together, as shown in Fig. 2, and then imparting common oscillatory movements thereto by manipulation of the main lever 25.

It is sometimes desirable to increase the length of the flue cutter, and this may be done either by substituting a longer tube section 1 or adding a tube section thereto, and by substituting a longer threaded stem 14 than that shown in the drawings.

This improved flue cutter has no delicate parts that are likely to get out of repair or to be broken and is capable of being very easily adjusted and manipulated. In actual practice, it has been found highly efficient for the purposes had in view.

What is claimed is:

1. In a flue cutter, the combination with a tubular body and cutting wheels mounted for radial movements therein, of means for rotating said tubular body comprising a pawl-equipped lever and a ratchet wheel, means for moving said rollers radially outward comprising a wedge, a threaded stem, a threaded sleeve, a feed lever rigidly secured to said threaded sleeve and movable therewith, and a device movably mounted on one of said levers and detachably engageable with the other lever, to connect said two levers for common movements, at will.

2. In a flue cutter, the combination with a tubular body, of a pair of radially movable bearing blocks mounted therein and provided with cutting wheels, a wedge within

said tubular body engageable between said bearing blocks and provided with a projecting threaded stem, a sleeve swiveled to said tubular body and having threaded engagement with the end of said stem, a ratchet wheel connected to said tubular body for rotation therewith, a pawl equipped lever cooperating with said ratchet wheel, a feed lever connected to said threaded sleeve, and a lock bolt slidably mounted in said main lever and engageable with a seat or perforation in said feed lever, to lock the said two levers together at will.

3. In a flue cutter, the combination with a tubular body, of a pair of laterally movable arms within said tubular body, opposing springs yieldingly pressing said arms together, bearing blocks applied to the free ends of said arms and working in lateral openings in said tubular body, cutting wheels journaled in said bearing blocks, a wedge within said tubular body engageable between said bearing blocks, means for rotating said tubular body, and means for forcing said wedge between said bearing blocks.

4. In a flue cutter, the combination with a tubular body, of a pair of arms attached at one end to one end portion of said tubular body, opposing springs normally holding said arms pressed together and centered

within said tubular body, bearing blocks detachably secured to the free ends of said arms and working through lateral openings in said tubular body, cutting wheels journaled in said bearing blocks, a wedge within said tubular body engageable between said bearing blocks, means for rotating said tubular body, and means for forcing said wedge between said bearing blocks.

5. In a flue cutter, the combination with a tubular body, of a plug detachably seated in one end thereof, a pair of arms and a pair of opposing springs applied to said plug at one end, said springs tending to hold said arms pressed together and centered within said tubular body, bearing blocks applied to the free ends of said arms, cutting wheels journaled in said bearing blocks, a wedge within said tubular body engageable between said bearing blocks, means for rotating said tubular body, and means for forcing said wedge between said bearing blocks.

In testimony whereof we affix our signatures in presence of two witnesses.

EDWARD M. POPE.
ISIDOR J. B. HANTEN.

Witnesses:

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NICK J. STEICHEN.