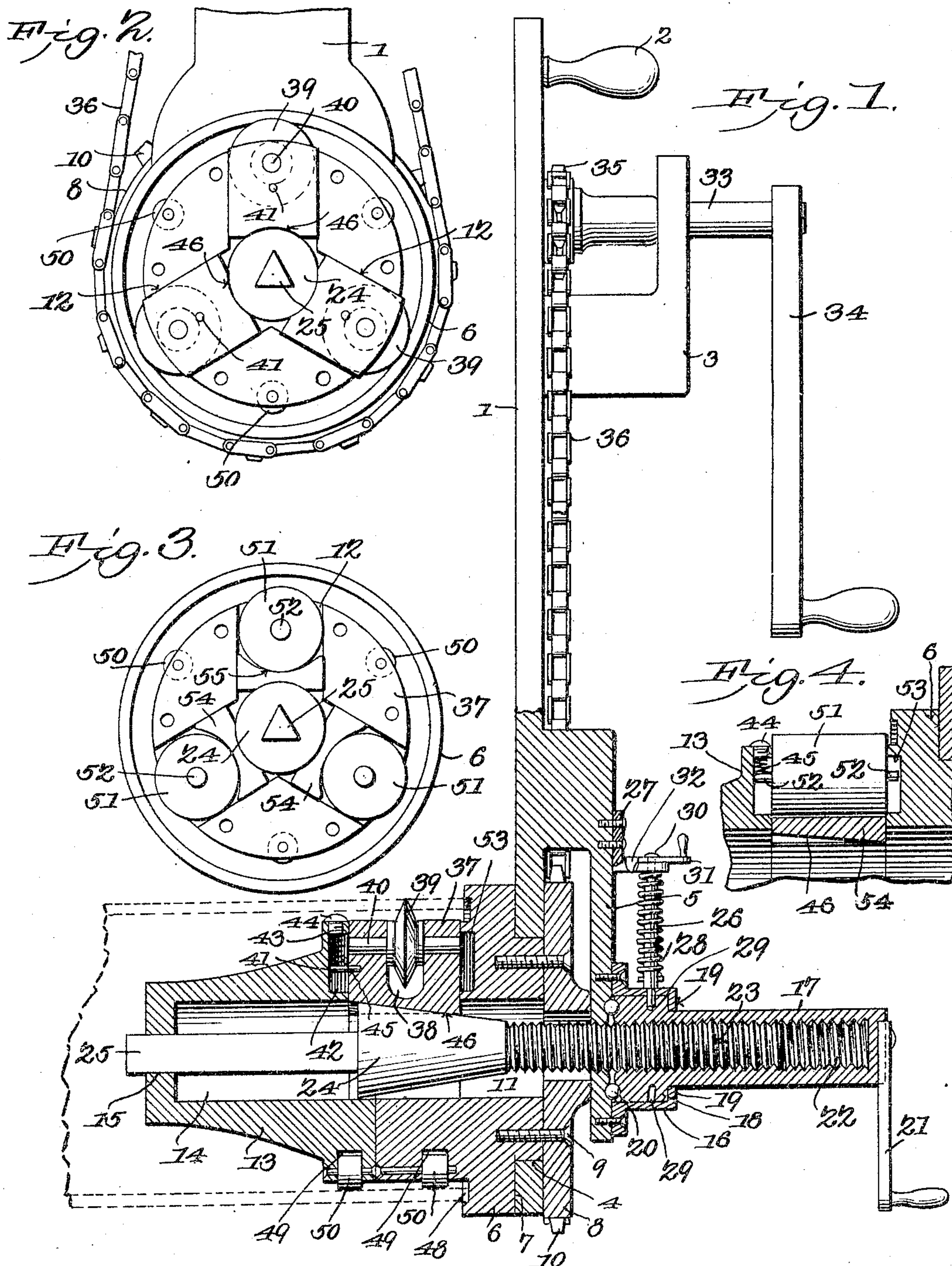


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S. W. BLEVINS.  
FLUE CUTTER AND EXPANDER.  
APPLICATION FILED MAR. 20, 1905.



Witnesses

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# UNITED STATES PATENT OFFICE.

SAMUEL W. BLEVINS, OF COOPER, TEXAS.

## FLUE CUTTER AND EXPANDER.

SPECIFICATION forming part of Letters Patent No. 794,337, dated July 11, 1905.

Application filed March 20, 1905. Serial No. 251,082.

*To all whom it may concern:*

Be it known that I, SAMUEL W. BLEVINS, a citizen of the United States, residing at Cooper, in the county of Delta and State of Texas, have invented a new and useful Flue Cutter and Expander, of which the following is a specification.

This invention relates to tools for cutting and expanding tubes and flues; and it has among its objects to simplify and improve the construction and operation of this class of devices.

With these and other ends in view, which will readily appear as the nature of the invention is better understood, the same consists in the improved construction and novel arrangement and combination of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings has been illustrated a simple and preferred form of embodiment of the invention, it being, however, understood that no limitation is necessarily made to the precise structural details therein exhibited, but that the right is reserved to any changes, alterations, and modifications to which recourse may be had within the scope of the invention and without departing from the spirit or sacrificing the efficiency of the same.

In said drawings, Figure 1 is a vertical sectional view of the device arranged as a flue-cutter. Fig. 2 is a rear elevation of the lower end or working portion of the same, the rear cap having been removed in order to expose the tool-carrying hub. Fig. 3 is a rear elevation of the tool-carrying hub, showing expanding-tools in position for operation in said hub. Fig. 4 is a sectional detail view illustrating one of the expanding-tools and related parts of the device.

Corresponding parts in the several figures are indicated throughout by similar characters of reference.

The frame of the improved device consists of a bar 1, provided near its outer end with a handle 2 and with a bearing-bracket 3, and provided near its inner end with an aperture 4 and with a bearing-bracket 5. Fitted for rotation in the aperture 4 is a hub 6, having a

shoulder 7 bearing against one side of the frame, in the aperture of which the said hub is securely retained by means of a disk 8, inserted between the bearing-bracket 5 and the main body of the frame and connected securely with the hub by means such as screws 9. This special construction is resorted to for the purpose of enabling the parts to be readily assembled in the process of manufacture. To all intents and purposes the disk 8, which is provided at its periphery with sprocket-teeth 10, is integral with the hub, and it may, if desired, be so constructed, in which event the frame will require to be made in two parts to enable the members of the device to be assembled, as will be readily understood.

The hub 6 is provided with an axial perforation or aperture 11, and it has in its rear side a plurality of radial recesses 12, each of which accommodates a tool-carrying block or box. The nature of said blocks or boxes and of the tools carried therein will be presently more fully described.

Suitably secured upon the rear side of the hub 6 is a flue-engaging cap 13, having an axial recess 14, which is in alinement with the axial perforation 11 of the hub, of which it may be regarded as forming a continuation. The cap 13 is preferably tapering in shape, and it is provided at its rear end with a non-circular aperture 15.

Suitably secured upon the front side of the bearing member 5 is a flange-cap 16, in which a barrel 17 is supported for rotation, said barrel being provided with a shoulder 18, engaging the flange 19 of the cap 16. Antifriction-balls 20 are interposed between the inner end of the barrel and the outer side of the bearing-bracket, and the barrel is provided at its outer end with a crank 21, whereby it may be conveniently rotated. Said barrel has a longitudinal threaded recess 22, engaging a threaded stem 23, formed with a conical enlargement 24, which operates in the bore formed by the aperture 11 and the recess 14, and terminating in a rearwardly-extending non-circular shank 25, which extends through the non-circular aperture 15. It will be seen that by rotating the barrel 17 the member comprising the screw-threaded stem 23, the cone



24, and the shank 25, and which as a whole is known as the "expander," may be moved longitudinally of the axis of the hub in either direction, according to the direction of rotation of the barrel. To secure the latter against rotation when desired, a stop member is provided, consisting of a spring-actuated pin 26, mounted slidably between the flange-cap 16 and a bracket 27, suitably secured upon the frame of the device, said sliding pin extending through perforations in said bracket and cap and normally forced inward by its actuating-spring 28, so as to engage one of a plurality of recesses 29 in the shouldered portion of the barrel, which latter will thus be held securely against rotation. The stop-pin 26 has a head 30, adjacent to which is mounted a handle 31, pivotally engaging the pin and having a cam member 32, which by turning the handle may be made to engage the bracket 27, so as to partly withdraw the stop-pin and release it from engagement with the barrel 17, which may then be freely rotated to operate the expander.

A shaft 33, which is mounted for rotation in the frame-bar 1 and in the bracket 3, is provided with an operating-handle 34, and it carries a sprocket-pinion 35, which is connected, by means of a chain 36, with the sprocket members 10 upon the hub, which latter may thus be rotated in its bearings.

The cutter-carrying boxes consist of blocks 37, fitted to slide in the radial recesses 12 of the hub, said blocks being provided in their outer sides with recesses 38, in which rotary cutters 39 are mounted upon transverse pins 40. The boxes 37 are provided upon their rear sides with laterally-extending pins 41, engaging recesses 42 in the front side of the cap 13, which latter is provided, in registry with said recesses, with screw-threaded apertures 43, in which are fitted adjusting-screws 44, the inner ends of which bear against springs 45, the latter being fitted in the recesses 42 between the pins 41 and the screws 44, which latter serve to adjust the tension of the springs, whereby the tool-carrying boxes are forced in an inward direction, as will be readily understood. The inner ends of the tool-carrying boxes are beveled, as clearly shown at 45 in Fig. 1 of the drawings, and said boxes are likewise transversely concaved, as best seen at 46 in Fig. 2, so as to engage the conical part of the expander, which latter when moved in a forward direction by the means herein described will serve to force the tool-carrying boxes radially in an outward direction, as will be readily understood. When the expander is moved in a rearward direction, the tension of the springs 45 will be sufficient to move the tool-carrying boxes in the direction of the axis of the hub, this retrograde movement being easily effected by the slight tension of the springs.

The hub 6 is provided in its rear side with

an annular groove 48 for the reception of the front end of the tube or flue which is to be operated upon. The hub 6 and the cap 13 are each provided with recesses 49, in which are journaled antifriction-rollers 50 to engage the tube or flue which is being operated upon.

The expanding-tools, which are sometimes substituted for the cutting-tools, consist of rollers 51, provided at the ends thereof with axial pins 52, engaging the recesses 42 in the cap 13 and corresponding recesses 53 in the hub, the pins which engage the recesses 42 being in engagement with the tension-springs 45, as will be seen in Fig. 4 of the drawings. The expanding-rollers 51 are carried by blocks 54, having concave faces 55, engaging said rollers and shaped upon their inner sides with longitudinal bevels and transverse concavities adapted to engage the conical member of the expander in like manner as the cutter-carrying boxes 37 already described.

From the foregoing description, taken in connection with the drawings hereto annexed, the operation and advantages of this invention will be readily understood by those skilled in the art to which it appertains. The tool-carrying boxes are normally forced in an inward direction by the action of the tension-springs, the expander being moved in a rearward direction prior to the insertion of the machine into the end of the tube which is to be operated upon. The machine is held in position by the handle 2. By rotating the barrel 17 the expander will be forced in a forward direction, forcing the tool-carrying boxes radially in an outward direction and causing the tools to engage the tube, which when the hub is rotated by turning the crank 34 will be cut or expanded, according to the character of the tools. The barrel 17 may be held against rotation by the means provided for the purpose while the hub is being rotated, and by releasing the barrel and gradually rotating the same the expander will be operated to advance the tools at any desired rate.

Having thus described the invention, what is claimed is—

1. In a device of the class described, a bar having a handle at one end, an aperture near the other end, and a bearing-bracket connected with and spaced from said bar; a hub journaled in the aperture of the latter and having an engaging shoulder bearing against one side of the frame-bar, a disk inserted between the bearing-bracket and one side of the frame-bar and connected securely with the hub; radially-movable tool-carrying boxes supported by the hub; and an axially-movable expander operatively connected with said hub.

2. In a device of the class described, a frame-bar having a handle at one end, an aperture near the other end, and a bearing-bracket connected with and spaced from said bar; a hub journaled in the aperture of the latter and



having an engaging shoulder bearing against one side of the frame-bar, a sprocket-disk inserted between the bearing-bracket and one side of the frame-bar and connected securely  
5 with the hub, radially-movable tool-carrying boxes supported by the hub; an axially-movable expander operatively connected with said hub; and means connected with the frame-bar and including a shaft supported for rotation,  
10 driving means for said shaft, a sprocket-pinion upon said shaft and a chain connecting said sprocket-pinion with the sprocket-wheel connected with the hub, for rotating the latter.

3. In a device of the class described, a hub  
15 supported for rotation and having radial recesses, tool-carrying boxes supported slidably in said recesses and having rearwardly-extending pins, a cap connected with the hub and having recesses accommodating said pins,  
20 springs fitted in said recesses and bearing

against the outer sides of the pins, and adjusting-screws fitted in apertures in the cap at the outer ends of the recesses.

4. In a device of the class described, a frame-bar having bearing-brackets and a handle, a  
25 hub supported for rotation in said frame-bar and having radially-movable tool-carrying boxes, said hub being provided with a sprocket-disk, a shaft supported for rotation in the frame at a distance from the hub and having  
30 a sprocket-wheel, and a chain connecting said wheel with the hub.

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

SAMUEL W. BLEVINS.

Witnesses:

W. G. WALTERS,  
R. D. BENNETT.