No. 663,544. Patented Dec. 11, 1900.

J. S. HILL.

PIPE CUTTER.

(Application filed Mar. 7, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

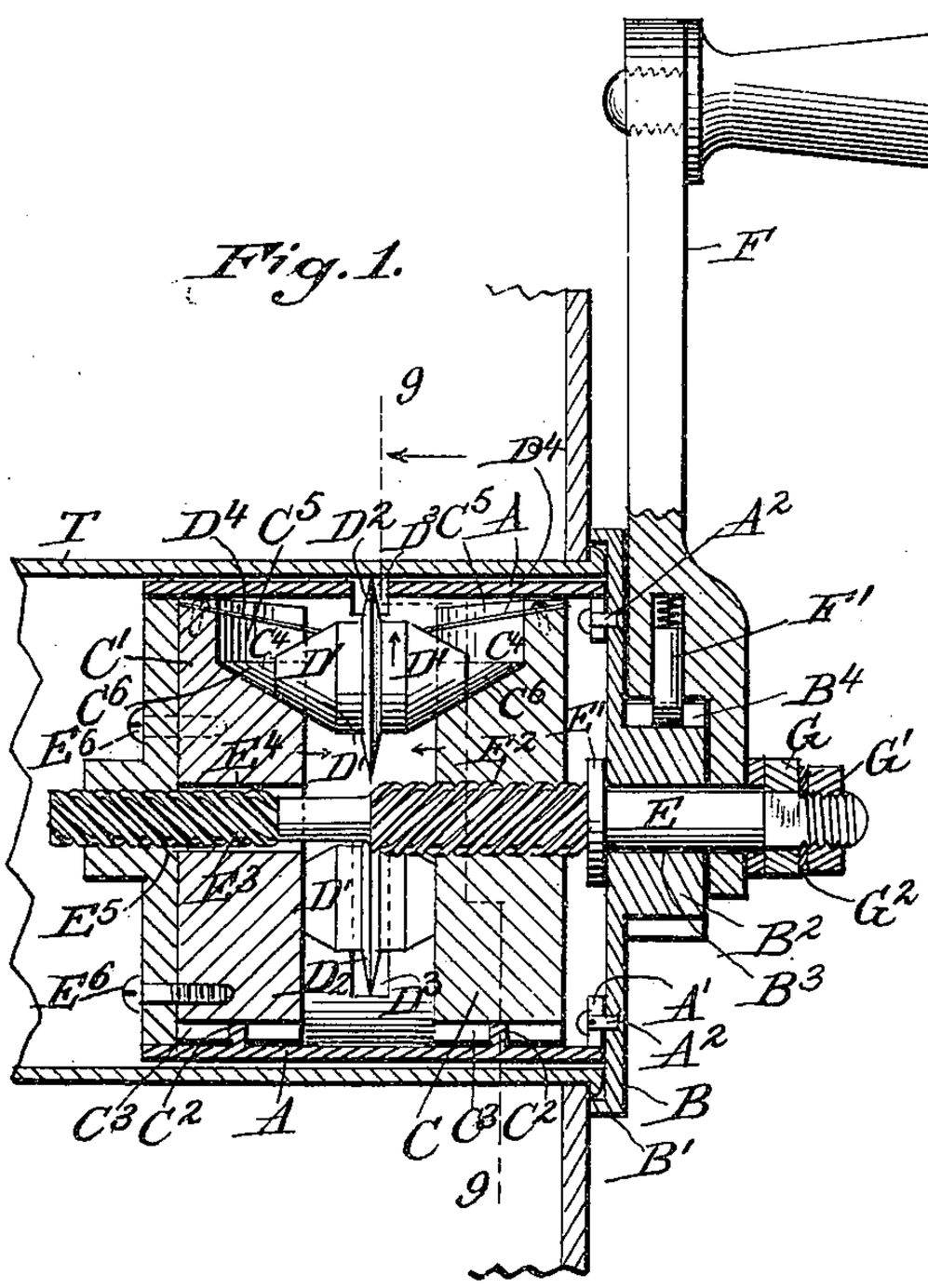


Fig. 2.

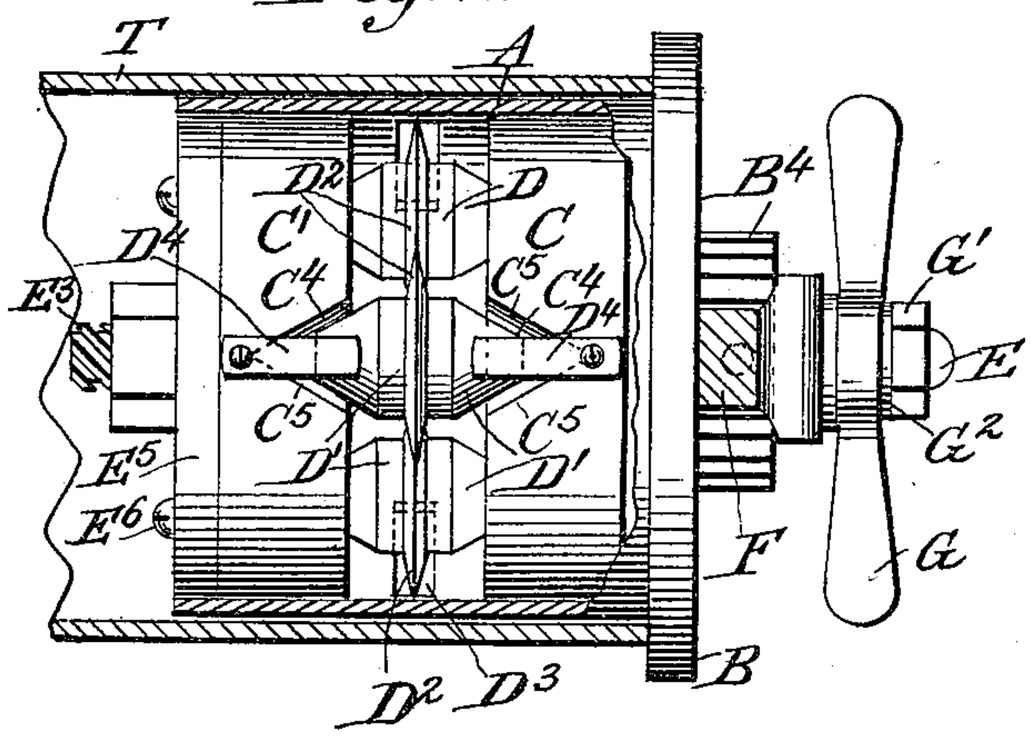


Fig. 3.

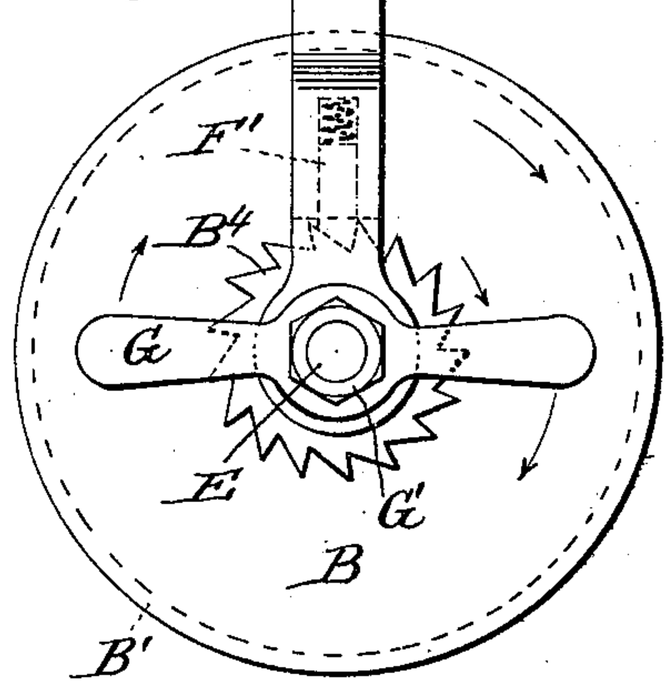
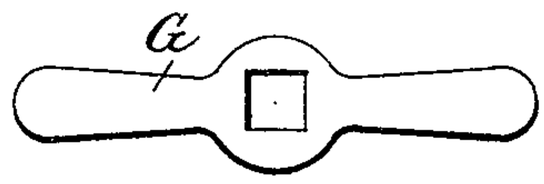


Fig. 4.



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(No Model.) 2 Sheets—Sheet 2.

Fig. 5.

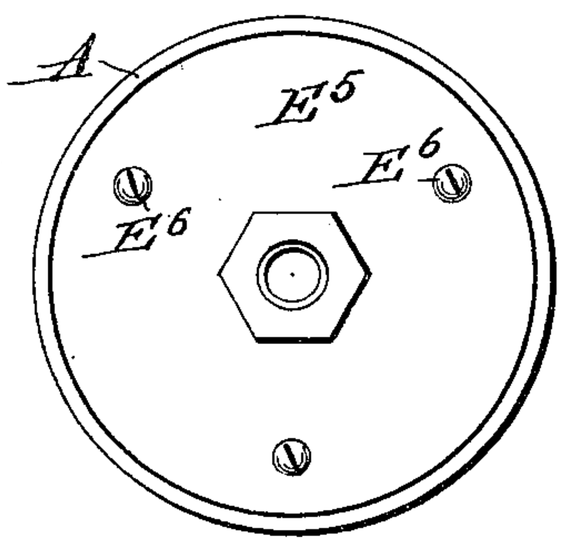


Fig. 6.

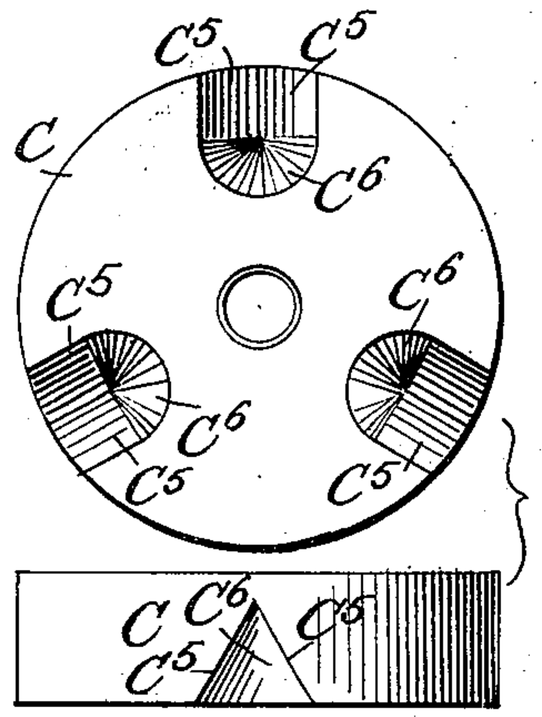


Fig. 7.

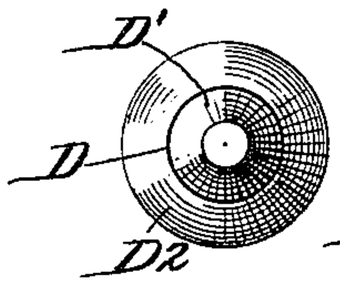


Fig. 8.

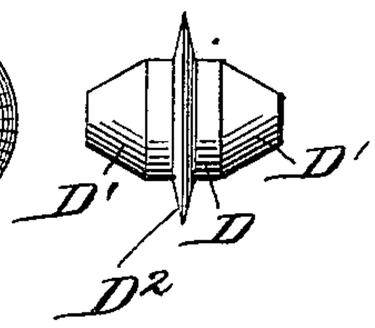
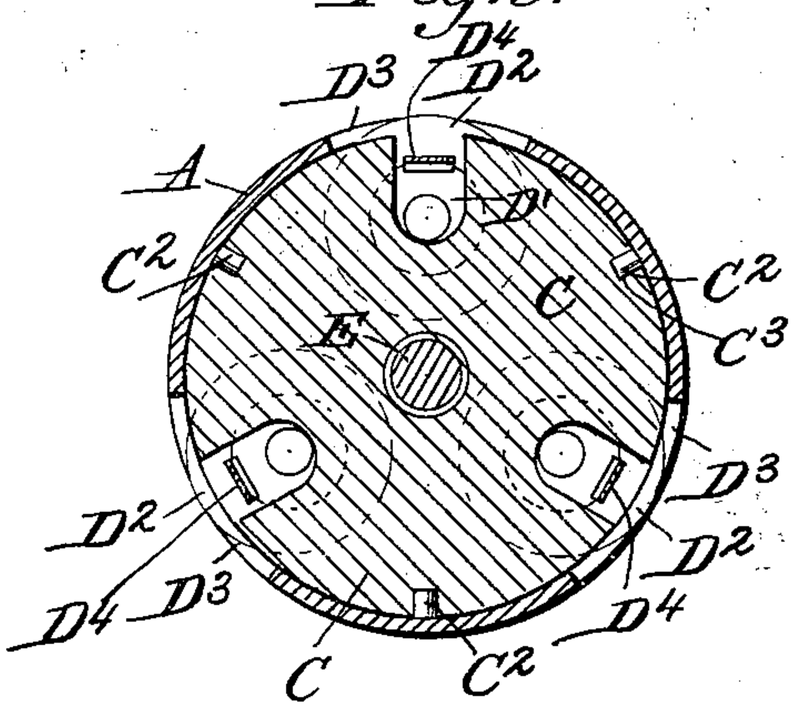


Fig. 9.



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UNITED STATES PATENT OFFICE.

JOSEPH S. HILL, OF LOS ANGELES, CALIFORNIA.

PIPE-CUTTER.

SPECIFICATION forming part of Letters Patent No. 663,544, dated December 11, 1900.

Application filed March 7, 1900. Serial No. 7,716. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH S. HILL, a citizen of the United States, and a resident of Los Angeles, in the county of Los Angeles, in the State of California, but temporarily residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Pipe-Cutters, of which the following is a full, clear, and exact description, such as will enable those skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The invention relates to improvements in pipe-cutters of that class which are inserted in the pipe to cut the latter from its interior and which are particularly adapted to cutting boiler-tubes.

It consists in the novel construction, combination, and arrangement of parts, such as will be hereinafter fully described, pointed out in the appended claims, and illustrated in the accompanying drawings.

In the accompanying drawings, in which similar reference characters designate corresponding parts, Figure 1 is a longitudinal vertical sectional view of a pipe-cutter embodying the invention, showing it inserted in the end of a boiler-tube. Fig. 2 is a horizontal sectional view. Fig. 3 is an end view. Fig. 4 is a detail view showing the handle-bar for operating the cutter-adjusting mechanism. Fig. 5 is an end view opposite to that shown in Fig. 3. Fig. 6 is a detail view showing one of the cutter-carrying blocks. Figs. 7 and 8 are detail views of the cutter. Fig. 9 is a sectional view on the line 9 9 of Fig. 1.

The cylindrical shell A forms a casing in which several of the operative parts are mounted. At one end it has an inwardly-projecting flange A′, through which the rivets A^2 pass and secure to it the head B. The latter has a diameter greater than that of the shell and has the flange B′ projecting at right angles from its periphery in the direction of the shell. At a central point a boss B^2 projects outwardly from the head and has formed therein a bearing B^3, concentric with the longitudinal axis of the shell. The periphery of the boss is provided with ratchet-teeth B^4.

In the shell A is mounted the cutting mechanism. In the opposite ends of the shell are placed the cylindrical blocks C and C′, respectively. These blocks are movable lengthwise of the shell and are provided with mechanism for moving them simultaneously in opposite directions, so that they may be either brought together or moved farther apart. They are prevented from rotating within the shell by the studs C^2 projecting from the inner face of the shell into the grooves C^3 in the blocks. While these studs prevent the turning of the blocks, the movements of the latter lengthwise of the shell are not interfered with. In the inner face of each block are the pockets C^4, preferably three in number and located at regular intervals. A pocket of one block is directly opposite to a corresponding pocket in the other block. Each of the pockets has two relatively-inclined sides C^5 and a bottom C^6, having a semiconical shape. These bottoms slant in opposite directions and form bearing for the spindles of the cutters.

The cutters are three in number, and each consists of the cylindrical body D, the tapering spindles D′, projecting from the opposite ends of the body, and the annular blade D^2, projecting from the body intermediate of its ends and concentric with its axis. The spindles D′ are journaled in the opposite pockets C^4, and the blade D^2 registers with the opening D^3 in the wall of the shell A. The cutter is normally retracted by the springs D^4, secured to the blocks C and C′ and bearing on the spindles D′. By moving the blocks C and C′ together the cutter is forced outwardly by reason of its tapering spindles and the inclined bottoms of the sockets.

Mechanism is provided for moving the blocks C and C′ in the shell in opposite directions, so that they can be brought closer together or forced farther apart. In the bearing B^3, formed in the head B, is journaled the shaft E, which is prevented from moving outwardly by the collar E′, secured to the same inside of the head. The shaft extends into the casing and is provided with the opposite screw-threads E^2 and E^3, respectively. That portion of the shaft provided with the screw-threads E^2 has a greater diameter than the portion provided with the screw-threads E^3. The screw-threads E^2 engage with the block

C, which is provided with a suitably-screw-threaded opening for the purpose. That portion of the shaft provided with the screw-threads E^3 passes through the opening E^4 in the block C′ and engages with the plate E^5, secured to the outer side of the said block by the screws E^6. The plate E^5 is provided with a suitably-screw-threaded opening for the reception of the screw-threads E^3.

The object in making that portion of the shaft provided with the screw-threads E^2 of greater diameter than the portion provided with the screw-threads E^3 is to facilitate the assembling of the several parts. When the several parts are brought together first, the shaft E is inserted in the bearing B^3 from the inner side of the shell. Then the block C is inserted in the shell. As the screw-threaded opening in the block C has a greater diameter than that portion of the shaft provided with the screw-threads E^3, the block can be readily moved along the shaft until it is engaged by the screw-threads E^2. By turning the shaft the latter threads can be turned into the block. Thereby the block is moved into the shell until its grooves C^3 register with the studs C^2, which prevent the block from rotating in the shell. After the grooves and studs have registered, by a further turning of the shaft the block can be moved to its proper position. The cutters are then placed in the shell with their inner spindles registering with the pockets C^4. During this operation the shell is preferably held in a vertical position, so that the cutters will remain in place. Then the second block C′ is inserted in the shell, so that its grooves C^3 register with the studs C^2. As the opening E^4 through this block is of greater diameter than the screw-threaded portion E^3 of the shaft, the block can be readily moved into the shell to its proper position relative to the block C. The plate E^5 is then turned onto the screw-threaded portion E^3 of the shaft. As it does not come in contact with the studs C^2 it can be readily rotated without moving the shaft, so that there need be no turning of the latter to disturb the position of the block C. The plate E^5 is turned onto the shaft until it contacts with the block C′, to which it is secured by the screw E^6, so that when the plate is moved by the turning of the shaft the block will be moved with it.

It is obvious that by turning the shaft E the blocks C and C′ can be brought together or separated to either move the cutters outwardly or to allow their retraction by their respective springs.

Means for rotating the shell is provided. On the end of the shaft E projecting from the head B is journaled the crank F, which is provided with a spring-pressed pawl F′ for engaging with the teeth B^4. The construction of the pawl and teeth is such that when the crank is turned in one direction they will engage and the shell be thereby turned. When the crank is turned in the opposite direction, the pawl and ratchet will not engage, so the shell will not be turned.

Means for rotating the shaft E is provided. On the outer end of the shaft, which is squared for the purpose, is a handle-bar G, held in place by the nut G′ and separated from the crank by the washer G^2.

The operation of the device is as follows: The shell A is inserted in the end of the tube T and is moved into the same until the flange B′ contacts with the boiler-head. By turning the shaft E by means of the handle-bar G the blocks C and C′ are moved together. As the pitch of the screw-threads E^2 and E^3 is the same, the blocks will be moved the same distance, so that the position of the blades D^2 will always be in register with their respective openings D^3 in the wall of the shell. By moving the blocks together the cutters will be forced outwardly, owing to their tapering spindles and the inclined bearings in the bottoms of the pockets. As the cutters move outwardly the blades will engage with the inner face of the tube and be forced into the same to some extent. By means of the crank F and the intervening mechanism the shell is rotated, and the cutters, turning with it, cut the tube. By alternately moving the blocks together and turning the shell or casing the kerf can be gradually cut deeper until the tube is severed. To withdraw the device from the severed end of the tube, the shaft is turned in the opposite direction to move the blocks apart to permit the springs to retract the cutters.

While the hereinbefore-described embodiment of the invention is the preferred one, yet it can be departed from to a considerable extent without violating its spirit.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a pipe-cutter, a rotatable casing having an opening in its wall, blocks movable relatively to each other in said casing lengthwise of the latter, a cutter carried by said blocks and having oppositely-inclined bearings therein and registering with said opening in the wall of the casing, and means for moving said blocks together to project said cutter through said opening in the wall of the casing.

2. In a pipe-cutter, blocks movable relatively to each other and having relatively-inclined bearings, a cutter consisting of a body provided with spindles journaled in said oppositely-inclined bearings of the blocks and an annular blade projecting from said body intermediate of the spindles, and means for moving said blocks to bring them together or to separate them.

3. In a pipe-cutter, a rotatable casing having an opening in its wall, blocks movable relatively to each other in said casing and provided with oppositely-inclined bearings, a

cutter consisting of a body provided with spindles journaled in said oppositely-inclined bearings of the blocks and an annular blade projecting from said body intermediate of the spindles and registering with said opening in the wall of the casing, and means for moving said blocks together to project said cutter through said opening in the wall of the casing.

4. In a pipe-cutter, blocks having oppositely-inclined bearings, a cutter journaled in said oppositely-inclined bearings, and a rotatable shaft having opposite screw-threads engaging with said blocks respectively to move them in opposite directions.

5. In a pipe-cutter, a rotatable casing, blocks movable in said casing lengthwise of the same and provided with oppositely-inclined bearings, a cutter journaled in said bearings, a rotatable shaft having opposite screw-threads respectively engaging with said blocks to move them in opposite directions, and means for turning said casing.

6. In a pipe-cutter, a cylindrical casing provided with an opening in its wall and having a head, blocks movable in said casing lengthwise of the latter and provided with oppositely-inclined bearings, a cutter journaled in said bearings and registering with said opening in the wall of the casing, a rotatable shaft journaled in said head of the casing and having opposite screw-threads respectively engaging with said blocks to move the latter together to project said cutter through said opening in the wall of the casing, and means for turning said casing.

7. In a pipe-cutter, blocks movable relatively to each other and having oppositely-inclined bearings, a cutter consisting of a body provided with spindles journaled in said oppositely-inclined bearings of the blocks and an annular blade projecting from said body intermediate of the spindles, and a rotatable shaft having opposite screw-threads respectively engaging with said blocks to move the latter in opposite directions.

8. In a pipe-cutter, a cylindrical casing provided with an opening in its wall and having a head, blocks movable in said casing lengthwise of the latter and provided with oppositely-inclined bearings, a cutter consisting of a body provided with spindles journaled in said oppositely-inclined bearings of the blocks and an annular blade projecting from said body intermediate of the spindles and registering with said opening in the wall of the casing, a rotatable shaft journaled in said head of the casing and having opposite screw-threads respectively engaging with said blocks to move them together to project said cutter through said opening in the wall of the casing, and means for turning said casing.

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

JOSEPH S. HILL.

Witnesses:
GRANT BURROUGHS,
H. R. HOWENSTEIN.