Aug. 17, 1948. S. SIPSMA ET AL 2,447,371

SINGLE WHEEL RATCHET PIPE CUTTER

Filed April 30, 1945 2 Sheets-Sheet 1

Fig. 1.

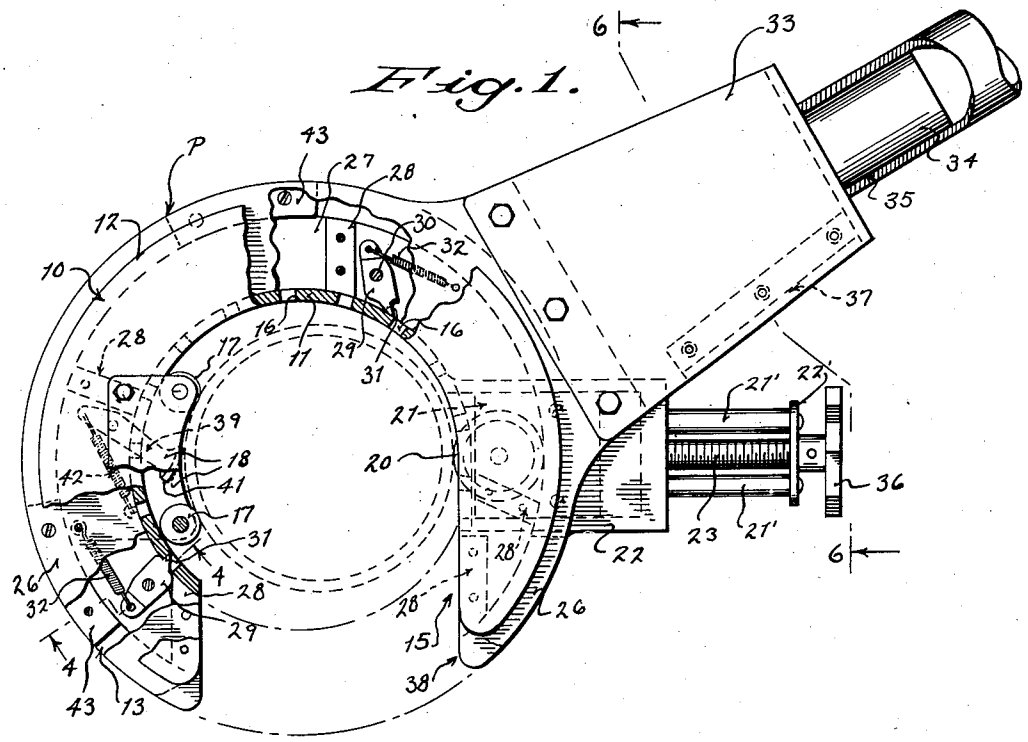
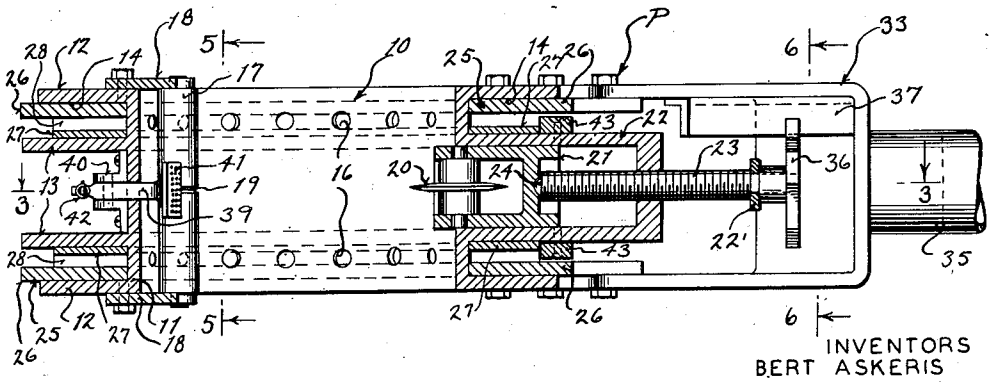


Fig. 2.



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Fig. 3.

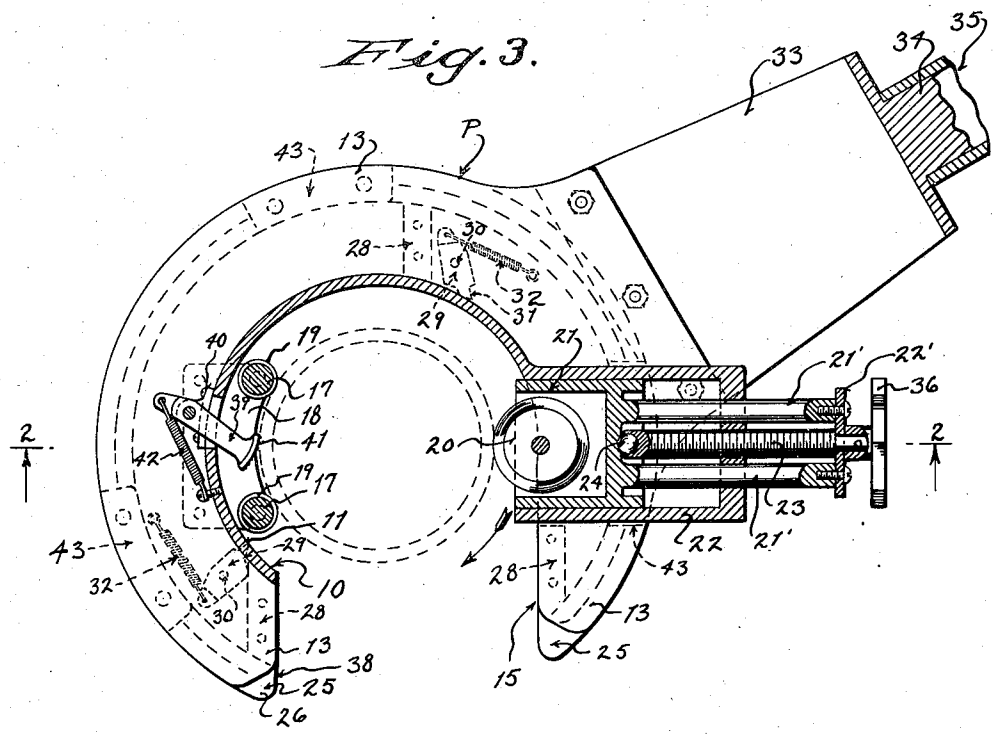


Fig. 4.

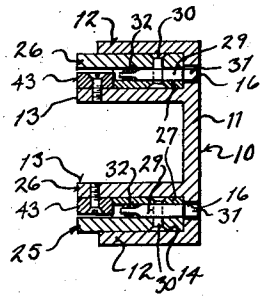


Fig. 5.

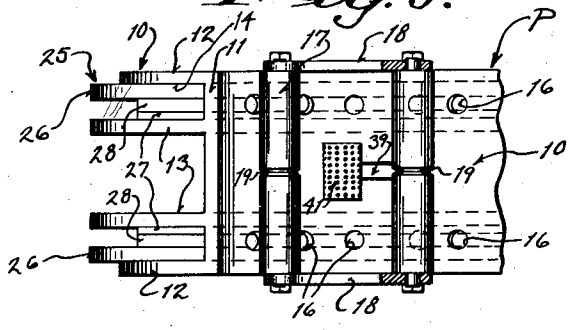
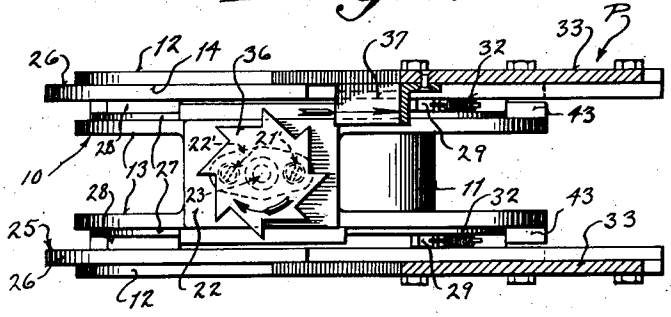


Fig. 6.



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SINGLE WHEEL RATCHET PIPE CUTTER

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4 Claims. (Cl. 30—99)

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This invention appertains to a device for cutting cylindrical objects in two, intermediate their ends, and more particularly to a novel ratchet pipe cutter.

One of the primary objects of our invention is to provide a ratchet pipe cutter which can be quickly and easily placed on a piece of pipe between the ends thereof, without the necessity of slipping the cutter over the end of the pipe and which can be readily operated irrespective of the position of the pipe, and whether the pipe is in a ditch or not.

Another salient object of our invention is to provide a pipe cutter embodying an inner C-shaped frame, carrying a single rotatable cutter blade and a pair of guide rollers, and an outer C-shaped frame rotatably associated with the inner frame, the inner and outer frames being adapted to be readily slipped off and on a pipe when said frames have their throats in alignment.

A further object of our invention is to provide a novel ratchet mechanism for operatively connecting the inner and outer frames together, whereby upon the turning of the outer frame in one direction, the inner frame can be turned therewith for cutting a pipe and upon the turning of the outer frame in the opposite direction, said outer frame can ratchet over the inner frame.

A further important object of our invention is to provide a novel clutch mechanism carried by the inner frame for engaging the pipe, so that upon the turning of the inner frame in one direction, the clutch can slip over the pipe for permitting the free rotation of the inner frame and cutter around the pipe and for automatically engaging the pipe to hold the inner frame against turning movement on the pipe in the opposite direction.

A further important object of our invention is to provide a single pipe cutter wheel located on the opposite side of the inner frame from the guide rollers, the guide rollers being of novel construction, whereby the metal from the pipe which is pushed aside by the cutter wheel will not interfere with the effective function of said rollers.

A still further specific object of our invention is to provide automatic means for advancing the cutter blade toward the pipe during the ratcheting of the outer frame over the inner frame, so that the proper and effective cutting of the pipe will take place.

With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts, as will be hereinafter more specifically described, claimed,

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and illustrated in the accompanying drawings, in which drawings:

Figure 1 is a top plan view of our novel pipe cutter with parts thereof broken away and in section to illustrate structural detail.

Figure 2 is a diametric section through the pipe cutter, the section being taken substantially on the line 2—2 of Figure 3, looking in the direction of the arrows.

Figure 3 is a sectional view taken at right angles to Figure 2, and substantially on the line 3—3 of Figure 2, looking in the direction of the arrows.

Figure 4 is a detail transverse sectional view through the inner and outer frames of the cutter, illustrating a pair of ratchet dogs for engaging the inner frame, the section being taken substantially on the line 4—4 of Figure 1, looking in the direction of the arrows.

Figure 5 is a detail sectional view taken on the line 5—5 of Figure 2, looking in the direction of the arrows, illustrating the novel guide rollers and the clutch shoe for engaging the pipe.

Figure 6 is a sectional view taken on the line 6—6 of Figures 1 and 2, looking in the direction of the arrows, the view illustrating the means for automatically advancing the rotatable cutter blade or disc.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter P generally indicates our novel ratchet pipe cutter, and the same includes an inner C-shaped frame 10 and an outer C-shaped frame 25.

The inner C-shaped frame 10 is of a substantially channel or U shape in cross section, and hence includes an inner circular wall 11 and top and bottom guide flanges 12. Secured to or formed on the inner wall 11 are a pair of spaced inner guide flanges 13, and these flanges are also spaced from the top and bottom walls 12 and define in conjunction therewith substantially annular guideways 14, for a purpose, which will be later set forth. As the inner frame 10 is of a C-shape in plan, the flanges 12 and 13 and the inner wall 11 are so shaped as to define an entrance throat 15 whereby the inner frame can be slipped over a length of pipe. The inner wall 10 is provided with a pair of spaced rows of ratchet openings 16 and the rows of openings 16 are located between the flanges 12 and 13, for a purpose, which will also hereinafter more fully appear. Carried by the inner frame at one side of the throat entrance 15 is a pair of transversely ex-

tending guide rollers 17 and these guide rollers are rotatably carried by bearing plates 18 which can be riveted or otherwise secured to the outer faces of the flanges 12. These guide rollers are adapted to snugly engage a length of pipe when the cutter is placed thereon, and each guide roller, at its longitudinal center, is provided with an annular groove 19, for riding over the burrs produced on the pipe.

The inner frame also carries a rotatable cutter wheel or disc 20, and this disc is located on the opposite side of the frame from a point midway between said rollers. It is to be noted that this cutter disc is arranged in alignment with the grooves 19 in the guide rollers 17. A sliding carriage 21 is provided for rotatably carrying the cutter disc, and this carriage is movable radially toward and away from the axial center of our pipe cutter. A guide housing 22 is formed on, or carried by, the inner guide flanges 13, and is so shaped that lateral shifting of the carriage is prevented. This guide housing 22 has threaded therein a feed screw 23, and the inner end of the feed screw carries an anti-friction thrust bearing 24 for engaging the carriage. It can be seen that when the feed screw 23 is turned in one direction, the same will forcibly urge the carriage inwardly with the cutter blade 20 toward the axial center of our pipe cutter. The feed screw is automatically turned, by means which will be later described. The carriage 21 has formed therefor or secured thereto a pair of guide rods 21', and these rods slidably extend through the housing 22. The outer ends of the guide rods are connected by a cross plate 22' and the feed screw is rotatably connected with this plate in such a manner that the plate is moved with the feed screw during the feeding thereof in and out of the housing.

The outer frame 25 includes upper and lower spaced C shaped plates 26 and one plate is adapted to be received between one set of flanges 12 and 13 of the inner frame and the other plate is adapted to be received between the other flanges 12 and 13. Each of the plates 26 has riveted or otherwise secured thereto a C-shaped guide plate 27, and these plates 27 engage the adjacent faces of the flanges 13. The plates 27 are held in spaced relation to the plates 26 by spacer blocks 28 and the plates 26 and 27 and the blocks 28 can all be riveted together. The space between the plates 26 and 27 is utilized for the reception of ratchet dogs 29. These dogs are rockably mounted between their ends on pivot pins 30 carried by the plates 26 and 27. The inner ends of the dogs have formed thereon ratchet teeth 31 which are adapted to engage the walls of the openings 16 of the inner frame when the outer frame is turned in one direction. Contractile coil springs 32 are connected with the outer ends of the dogs and to the outer frame for normally urging teeth 31 of the dogs into constant engagement with the outer face of the inner wall 11 of the inner frame. The upper and lower plates 26 of the outer frame are rigidly connected together, so that these plates will be turned as a unit by means of a U-shaped bracket 33. This bracket is of such a size as to readily pass over the housing 22 for the carriage 21. The outer end of the bracket 33 is formed, as at 34, for detachably receiving an elongated operating handle 35.

From the description so far, it can be seen that when the outer frame 25 is turned by the handle 35, the ratchet dogs will operatively engage the inner frame and turn the inner frame therewith so that the cutter disc 20 will make the desired cut in the pipe. Upon retrograde movement of the outer frame, the ratchet dogs will ride out of the opening 16 and ratchet thereover, and consequently the inner frame will not be turned.

As heretofore stated, the cutter disc is automatically advanced during the ratcheting of the outer frame on the inner frame and to bring this about, the outer end of the feed screw 23 has keyed or otherwise secured thereto a ratchet wheel 36. The inner face of the bracket 33 has secured thereto an L-shaped angle iron or rib 37, and during the movement of the bracket past the ratchet wheel, the rib will engage a tooth of the ratchet wheel 36 and turn the feed screw 23 in the desired direction so that the carriage 21 will be slid inwardly in said housing. If desired, the other side of the bracket 33 can be provided with a similar rib 37, in which case this additional rib would be diagonally opposite the rib shown.

When the throat 38 of the outer frame 25 is in alignment with the throat 15 of the inner frame, the cutter, as a unit, can be slipped on and off of the pipe. It is to be understood, however, that the carriage 21 carrying the cutter disc 22 is fed outwardly to permit the placing of the cutter on said pipe. After the cutter is properly disposed, then the ratchet wheel 36 can be turned manually until the cutter disc 22 bites into the pipe, after which the outer frame can then be turned.

During the cutting of the pipe, the cutter disc will push the metal to each side thereof and the annular grooves 19 in the guide rollers provide a space for riding over this metal. Consequently the guide rollers will not be forced away from the pipe and a true guide will be had at all times.

During the ratcheting of the outer frame over the inner frame, there might be a tendency of the inner frame to ride back with the outer frame, and in order to avoid this and to insure the holding of the inner frame on the pipe, we provide a novel clutch mechanism. This clutch mechanism includes a lever 39, which is rockably mounted intermediate its ends on a suitable bracket 40 riveted or otherwise fastened to the outer face of the wall 11 of the inner frame. The inner end of the lever 39 has formed thereon or secured thereto a shoe 41. The outer face of this shoe can be roughened for catching the pipe and the shoe is normally urged toward the pipe by a contractile coil spring 42. One end of the spring is connected to the outer end of the lever and the opposite end of the spring is connected to the inner frame. The swinging of the lever is such that when the inner frame is turned on the pipe in one direction, the shoe will slide over the pipe. However, when there is a tendency of the inner frame to turn on the pipe in the opposite direction, the shoe will bite into the pipe and hold the inner frame against movement thereon.

Secured to the inner flanges 13 of the inner frame 10 are guide blocks 43, and these guide blocks engage the outer edges of the guide plates 27 of the outer frame. Hence, these blocks 43 form an effective means for retaining the inner and outer frames in proper relation and prevent shifting of these frames relative to one another, but still function to permit the turning of the frames relative to one another.

By referring to Figures 1 and 3 of the drawings, it can be seen that the dogs 29 are so positioned that there always will be certain of the dogs in operative engagement with the inner frame, irrespective of whether the throats of the inner and outer frames are in alignment or not.

Obviously, pipes or cylinders of various sizes

may be cut and, as indicated in Figure 1, a proportionately large pipe is illustrated, wherein the said pipe is positioned eccentrically of the circular opening, while in Figure 3 of the drawings, the pipe is smaller, and, as indicated, is arranged concentrically with the tool.

From the foregoing description, it can be seen that we have provided an especially simple and durable pipe cutter of a C shape in plan, which can be easily slipped on and off a pipe intermediate the length thereof.

Changes in details may be made without departing from the spirit or the scope of our invention, but what we claim as new is:

1. A pipe cutter comprising an inner frame and an outer frame, the outer frame being rotatably mounted on the inner frame, and each of said frames being of a C shape, means for turning the outer frame, a ratchet mechanism operatively connecting the outer frame with the inner frame, a pair of transversely extending guide rollers carried by the inner frame for engaging a length of pipe, and a single disc cutter blade carried by the inner frame opposite a point between said guide rollers for engaging the pipe, and a clutch mechanism for engaging the pipe when the inner frame has a tendency to turn on the pipe in one direction.

2. A pipe cutter comprising an inner frame and an outer frame, the outer frame being rotatably mounted on the inner frame, and each of said frames being of a C shape, means for turning the outer frame, a ratchet mechanism operatively connecting the outer frame with the inner frame, a pair of transversely extending guide rollers carried by the inner frame for engaging a length of pipe, and a single disc cutter blade carried by the inner frame opposite a point between said guide rollers for engaging the pipe, and a clutch mechanism for engaging the pipe when the inner frame has a tendency to turn on the pipe in one direction, said clutch mechanism including a lever rockably mounted intermediate its ends on the inner frame, a shoe for engaging the pipe on the inner end of the lever and spring means connected with the lever for normally urging the shoe in one direction and into engagement with the pipe.

3. A pipe cutter comprising an inner frame and an outer frame, the outer frame being rotatably mounted on the inner frame, and each of said

frames being of a C shape, means for turning the outer frame, a ratchet mechanism operatively connecting the outer frame with the inner frame, a pair of transversely extending guide rollers carried by the inner frame for engaging a length of pipe, and a single disc cutter blade carried by the inner frame opposite a point between said guide rollers for engaging the pipe, and a clutch mechanism for engaging the pipe, when the inner frame has a tendency to turn on the pipe in one direction, said clutch mechanism including a lever rockably mounted intermediate its ends on the inner frame, a shoe for engaging the pipe on the inner end of the lever and spring means connected with the lever for normally urging the shoe in one direction and into engagement with the pipe, said lever being arranged between the guide rollers.

4. A pipe cutter comprising inner and outer frames of a C shape, the outer frame being rotatably mounted on the inner frame, a ratchet mechanism operatively connecting the outer frame with the inner frame, a pair of transversely extending guide rollers carried by the inner frame, a housing secured to the inner frame opposite a point between said rollers, a carriage slidably mounted in said housing, a rotatable disc cutter carried by the housing, a feed screw threaded into the housing and engaging the carriage, a ratchet wheel secured to the screw, a U shaped bracket secured to the outer frame for straddling the housing and the ratchet wheel, means for turning the outer frame, and an elongated rib carried by the bracket for engaging the ratchet wheel during the turning of the outer frame on the inner frame.

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