Dec. 27, 1955 E. V. ELLIOTT 2,728,137

ADJUSTABLE INTERNAL TUBE CUTTERS

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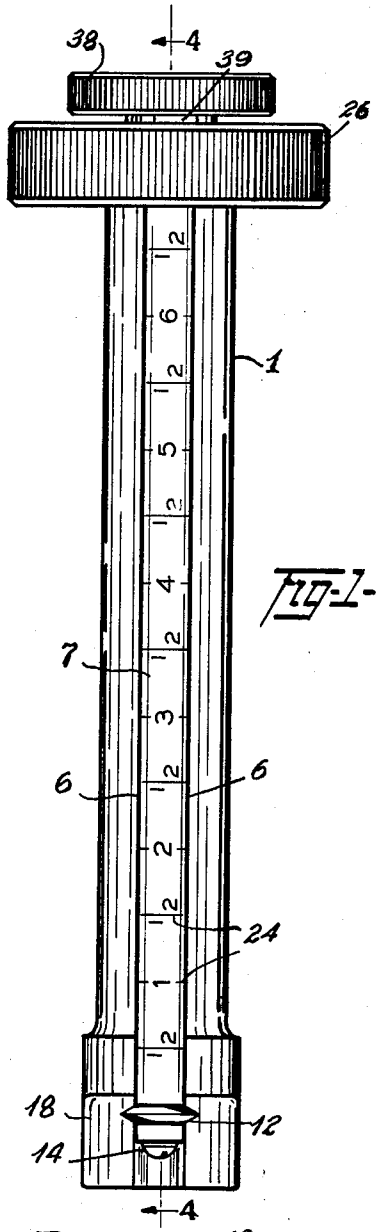


Fig-1-

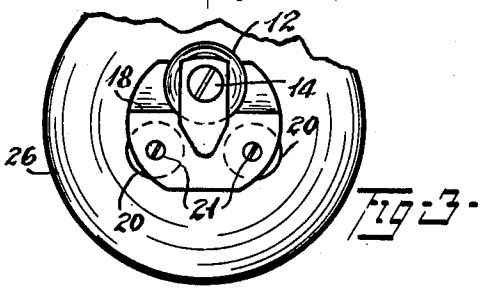


Fig-3-

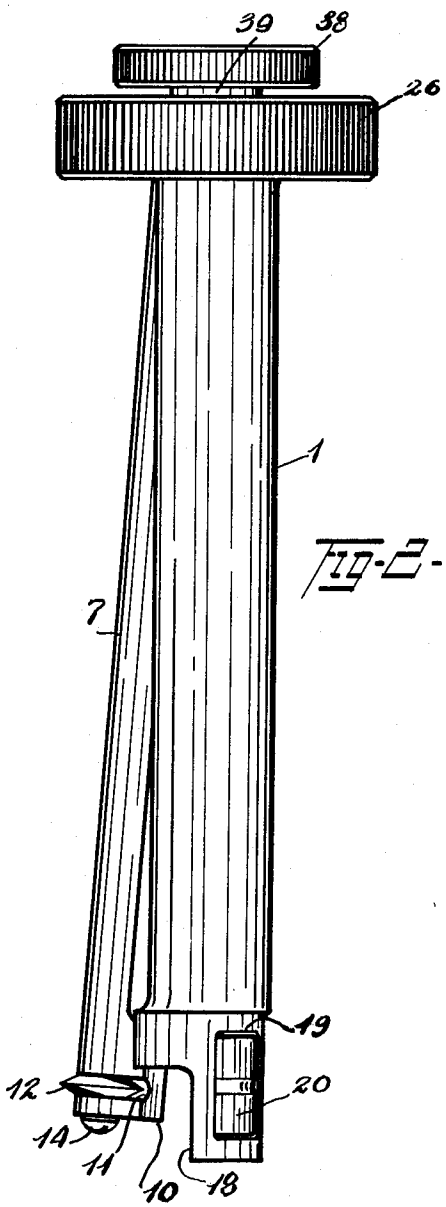


Fig-2-

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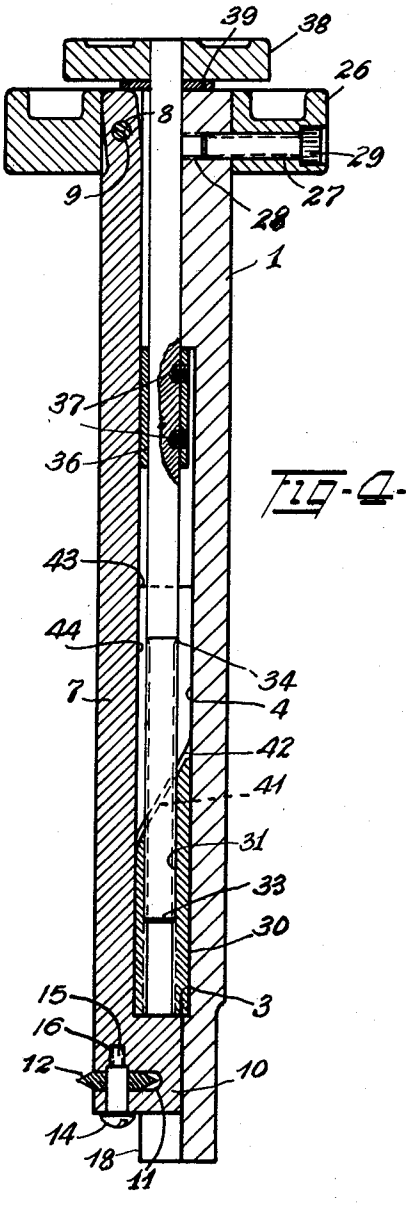


Fig-4-

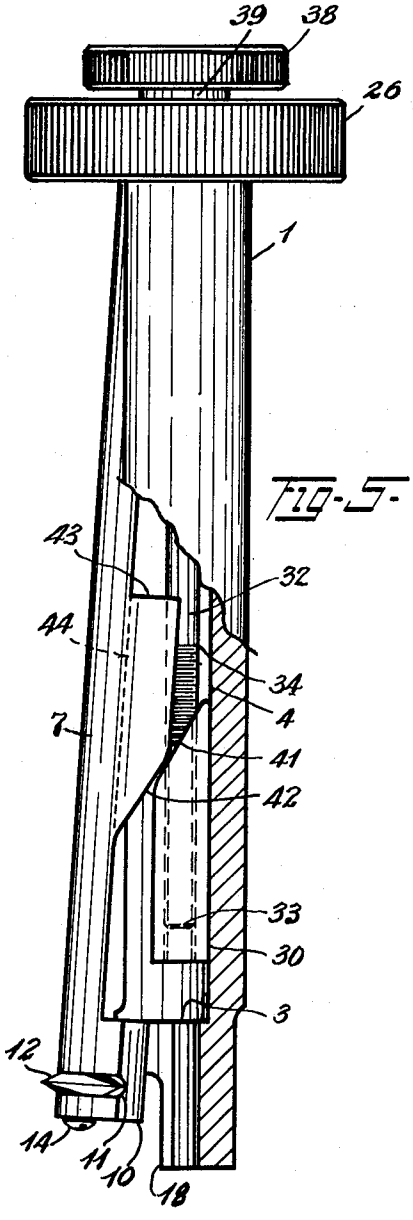


Fig-5-

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ADJUSTABLE INTERNAL TUBE CUTTERS

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4 Claims. (Cl. 30—107)

This invention relates to tube cutters, and more particularly to adjustable internal tube cutters.

Heretofore, internal tube cutters have been provided with various types of supports and cutter elevators requiring stabilizing elements and a multiplicity of parts.

An object of this invention is to provide an internal tube cutter which can cut various lengths of tubing, will positively seat within tubes of varying diameter, and firmly position the cutter element in operable elevated position.

A further object of this invention is to provide an internal tube cutter having a minimum number of parts, which will be simple and economical in construction and efficient and durable in use.

The foregoing and other objects and advantages of this invention will be more apparent from reading the following specification, in conjunction with the drawings, forming a part thereof, wherein:

Fig. 1 is a plan view of the internal tube cutter;

Fig. 2 is a side elevational view of the internal tube cutter, with the cutter and cutter arm elevated;

Fig. 3 is a front elevational view of the internal tube cutter, fragmentary section removed;

Fig. 4 is a longitudinal cross-sectional view taken along line 4—4 of Fig. 1, parts shown in elevation for clarity; and

Fig. 5 is a partially broken side elevation view showing parts in section to illustrate the internal working cam elements to raise and lower the cutter arm.

In the drawings, wherein like members are given the same reference numeral, a hollow, heavy-walled tubular member 1 serves as a hollow cylindrical housing element. The internal wall of the housing 1 is provided with a flat section 4 terminating in a pair of spaced shoulders 3 provided by removing a section of the internal wall.

A longitudinal slot 6 or groove is provided in and through the side wall of the housing 1 diametrically opposite said flat section 4 and extends the length of the housing 1 and communicates with the hollow interior thereof to provide a rectangular channel.

Mounted in this recess or groove 6 is a cutter arm 7 having an aperture 8 in one end thereof to receive a pivot pin 9 extending through the housing 1 to permit pivotal motion of the arm. The other end of the cutter arm is preferably an enlarged section 10 and provided with a transverse slot or groove 11 into which is rotatably mounted a rotary or circular cutter blade 12. The blade is pivotally mounted by a pivot bolt 14 having a reduced threaded section 15 engaging a tapped aperture 16 in the arm 7 in a conventional manner of concentrically aligned apertures in the arm 7 and cutter 12.

The housing 1 is preferably reduced to half section 18 on an enlarged end adjacent the cutter 12 to provide free clearance of the cutter, and the tapered enlarged section 10 of the cutter arm 12 fits into the hollow channel defined by the interior wall of the housing 1 when the cutter arm is lowered.

Into the periphery of half section 18 are provided a plurality of longitudinal pocket grooves 19 into which are journaled roller bearings 20, in a manner such that the rollers project slightly from the pockets and held therein in any suitable manner, such as journal pins 21. Any number of rollers 20 may be used, but two such rollers spaced equiangular and equidistant from the cutter has been found to be most satisfactory. The rollers are preferably substantially symmetrical to a plane transverse the housing at the cutter.

The cutter arm 7 is provided with indicia 24 to indicate the distance from the cutter blade 12.

The housing 1 with the cutter blade 12 pivotally mounted thereto through the cutter arm 7 may be rotated in any conventional manner; but, a knurled ring 26 having a shouldered aperture 27 aligning with a tapped aperture 28 in the pivot end of the housing 1 into which a bolt 29 is threadedly engaged is a preferred method of effecting manual rotation of the housing. The cutter arm 7 has a portion removed on its upper side beneath the ring 26 to permit rotation of the arm 7 upwardly.

The means of elevating and lowering the cutter blade 12 is a marked improvement over prior practices. Fitted into the flat section between the shoulders 3 is a sliding block 30 having a longitudinal tapped aperture 31 extending therethrough to engage a bolt 32 having a threaded end section starting at 33 and ending at 34. The bolt 32 has a sleeve 36 secured thereto in any suitable manner, such as set screws 37; and the sleeve abuts the shoulder 3 to prevent longitudinal movement in one direction, whereas a knurled turning knob 38 having a spacer element 39 between it and the housing 1 prevents longitudinal movement of the bolt 32 in the other direction. By turning the knob 38, the bolt 34 engages the block 30, moving it longitudinally in the housing. The block cannot rotate due to its height being greater than its width and the channel in which it rides.

The sliding block 30 is provided with an angular plane face 41 which cooperates with a downward supplementary angular split face 42 on a projection 43 intermediate the ends of the cutter arm 7 to cam the cutter blade upwardly and also downwardly as the sliding block moves longitudinally back and forth in the housing 1 by threaded engagement of the bolt 32 and tapped aperture 31. The shoulder 3 limits movement of the sliding block 30 in that direction.

The projection 43 is provided with a longitudinal channel 44 to receive the bolt 32; and, the sliding block 30 is intermediate the projection 43 and shoulder 3.

In operation, the device is quite simple and efficient; and for description of use, the tool will be described as used in the plumbing trade for cutting stub tubing near plastered walls when installing fixtures in new homes—heretofore a difficult task without spoiling the walls. First there is determined the number of inches of tubing that must be cut off, then the cutter is inserted in the tube until the end of the tube registers with the indicia of the arm 7 as to the number of inches. The knurled knob 38 is turned to threadedly engage the bolt 32 and sliding block 30 to actuate the cam surfaces 41 and 42 to pivot the cutter arm 7 and cutter blade 12 upwardly to cut into the tube wall. The housing is then turned a revolution with the knob 26 to cut the tube. If the tube wall is of sufficient thickness that one cutting doesn't sever the tube, the knob 38 is further turned after one revolution to set the cutter blade 12 for further cutting on further turning of the housing.

The rollers 20 in conjunction with the cutter blades 12 keep the tool properly aligned; and the supplementary angular cams 41 and 42 maintain the cutter blade in firm and rigid position.

The invention has been described in detail, but it is

clearly understood that many changes can be made therein without departing from the spirit and scope thereof, as defined in the appended claims.

Having thus described the invention what is claimed as new and desired to secure by grant of United States Letters Patent is:

1. An internal tube cutter comprising an elongated housing, a cutter arm pivotally mounted at one end thereof to said housing, a rotary cutter blade pivotally mounted to the other end of said cutter arm, a channel provided in said housing beneath said cutter arm, a sliding block slidably positioned in said channel, a tapped aperture extending longitudinally in said block, a bolt threadedly engaging said block, means preventing longitudinal movement of said bolt, a downward projection on said cutter arm, cooperation supplementary angular cam faces on said block and said projection, rollers longitudinally journaled in said housing and extending beyond the periphery thereof substantially in the plane of said cutter blade, and manual rotating means fastened to said housing.

2. An internal tube cutter comprising a hollow cylindrical housing, a longitudinal channel provided in and through the wall of said housing, a cutter arm pivotally mounted by one end thereof in said channel, a cutter blade pivotally mounted transversely in the other end of said cutter arm, longitudinal rollers journaled in said housing substantially in the plane of said cutter and extending beyond the periphery of said housing, a sliding block mounted in said hollow housing, a projection extending downward from said cutter arm into said housing adjacent said sliding block, cooperating supplementary angular cam surfaces on said sliding block and said projection, a bolt extending longitudinal in said housing, stop means preventing longitudinal movement of said bolt, a longitudinal tapped aperture in said block threadedly engaging said bolt, means external of said housing for turning said bolt to operably adjust the relationship of said cam surfaces, and means manually rotating said housing.

3. An internal tube cutter comprising a cylindrical housing, a longitudinal channel in said housing, a cutter arm pivotally mounted by one end in said channel, a transverse groove in the free end of said cutter arm, a circular cutter blade pivotally mounted in said transverse groove, elongated pockets in said housing substantially symmetrical to the plane of said cutter, rollers journaled in said pockets and extending beyond the periphery of said housing, a projection extending inwardly of said housing from said cutter arm, a sliding block in said housing intermediate said projection and said cutter, supplementary cam surfaces on said projection and said block, a tapped aperture extending longitudinal through said block, a bolt threadedly engaging said tapped aperture, and means preventing longitudinal movement of said bolt.

4. An internal tube cutter comprising an elongated hollow cylindrical housing, a longitudinal channel in said housing having a portion thereof communicating with the hollow interior of said housing, a cutter arm pivotally mounted by one end thereof in said channel, a transverse groove in the other end of said arm, a circular cutter blade journaled in said transverse groove, a projection extending from said arm into the hollow interior of said housing, a flat section in the hollow interior of said housing diametrically opposite said arm, a sliding block in said housing operable in said flat section, a bolt extending longitudinally in the hollow interior of said housing, means associated with said block for threadedly engaging said bolt, means preventing longitudinal movement of said bolt, and roller journaled in said housing and extended beyond the periphery thereof substantially in the longitudinal position of said cutter and spaced equidistant therefrom.

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