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Glass-Tube Cutter

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7 Claims. (Cl. 49—52)

This invention relates to glass-tube cutters and has for its objects the provision of an improved device of this character which acts to press the cutting tool into cutting relation to the inner periphery of the tube through internal rather than external pressure as heretofore employed, which acts, through the manner in which such pressure is applied internally, to eliminate tube loss by breakage, heretofore common, which through its improved manner of applying pressure affords a more effective purchase and acts to maintain a relatively constant tension irrespective of the length of tube being cut, which through its elimination of pressure-applying means externally of the tube allows the tube to be more effectively grasped by the operator for revolvingly actuating the tube relative to the cutting tool, and which otherwise is so constituted and devised as to simplify the structural design and provide a tube cutter generally more efficient than heretofore.

The invention consists in the novel construction, adaptation, and combination of parts hereinafter described and claimed.

In the drawing—

Fig. 1 is a view, partially in side elevation and partially in longitudinal vertical section, illustrating the now preferred embodiment of the invention as the same is applied in cutting a glass tube.

Fig. 2 is a fragmentary side elevation of the invention with the parts shown in their normal inoperative positions.

Fig. 3 is a fragmentary top view thereof.

Fig. 4 is a transverse vertical section taken through 4-4 of Fig. 1; and

Fig. 5 is a plan view to more particularly disclose the forked ends with which the spring employed in the device is provided.

The implement comprises a hollow cylindrical barrel, designated in the drawing by the numeral 5, and provided in the outer end thereof is an integral tip 7 which constitutes a prolongation of the barrel. The end of the barrel is longitudinally slotted and the assembly which I indicate employs a tip having a reduced extension sweated in the outer portion of the slotted end. Extending longitudinally as respects one side of the tip is a flattened seat 8 of a bowed contour and this seat terminates at its outer end in a notch 9 which, in transverse section, is desirably arcuate to receive one end of a terminally forked leaf spring 10, the opposite end of said spring fitting over a hook-forming projection 11 provided by an operating rod 12 slidably received in the bore of the barrel. Said projection 11 extends laterally through the end slot of the barrel and serves the dual purpose of preventing rotary movement of the rod and limiting the retractive movement thereof through a contact with the shoulder defining the rear terminus of the slot.

Supported by said tip to position the same diametrically opposite from the springs and radial col-

ly medially of the spring ends is a rotary cutter wheel 15 journaled on a removable pin 16 to pro-

trude the cutting perimeter slightly beyond the peripheral surface of the tip. Any character of cutting tool such, for example, as a diamond point or the metal alloy, Hastelloy, may be employed, in which event a suitable socket is provided in the tip to replace the transverse chordal slot which receives the wheel.

Reverting to the rod 12 which extends through the bore of the barrel, the exposed outer end of the same is threaded to receive a hand-operated button 17, the barrel having a finger-gripping member 18 fixedly secured thereon to accommodate compression by the operator's palm of the button 17 for actuating the spring 10 into tube-engaging bowed position.

19 indicates a sliding collar sleeved over the barrel, the collar providing a stop flange against which the tube to be cut is engaged. 20 designates a locking screw for the collar and I illustrate in the drawing a graduated scale emanating in the cutting plane of the wheel for positioning the collar, the scale being impressed or otherwise suitably formed on the surface of the barrel.

The operation of the device should be readily understood from an inspection of Figs. 1 and 4 of the drawing, the glass tube T being introduced over the device to engage the end against the stop flange of the positioned collar 19, following which the rod 12 is forced inwardly under pressure of the operator's palm to apply spring pressure to the inner wall of the tube at a point diametrical-

ly opposite from and in the approximate cutting plane of the wheel 15. The tube is turned by the operator through a complete revolution to effect a cutting penetration by the cutter wheel of what is commonly termed the inner skin of the glass, the cutter device is removed from the tube, and the tube is then snapped to easily separate the tube sections on the transverse line of the cut.

So far as I am aware, glass-tube cutters as previously developed have employed external pressure which generally is applied to the tube at a point radially aligned with the cutting tool, the resulting compression of the tube under the opposing influence of the tension mechanism and
the cutting tool, especially where any appreciable pressure is applied, resulting in a cracking of the tube. Tube-cutters of this character are, for such reason, impractical for use in cutting "Pyrex" tubes and similarly are incapable of practical use with glass tubes of relatively thick wall construction.

While I have herein described the illustrated preferred embodiment of my improvements, it is my intention that no limitations be implied other than as may appear in the following claims and I intend that such claims be given a breadth in their construction commensurate with the scope of the invention within the art.

What I claim, is:

1. A glass-tube cutter comprising the combination of a hollow cylindrical barrel insertable within the tube and provided with a segmental slot, a cutter wheel journaled for rotary movement in said slot to dispose the wheel in eccentric relation to the barrel with the cutting edge thereof exposed, a longitudinally extending leaf spring detachably carried by the barrel to locate the spring diametrically opposite from the cutter wheel, the ends of said spring extending approximately equal distances in opposite directions from the cutting plane of the wheel, and means comprising a rod slidably carried in the bore of the barrel, operatively engaging said spring, for bowing the spring outwardly to apply pressure upon the inner wall of the tube being cut.

2. The glass-tube cutter as defined in claim 1 in which a seat having a slightly bowed contour in side elevation is provided by the barrel to receive the spring in the normal expanded position of the spring for preventing a cramping action as the rod is actuated in its spring-contracting movement.

3. In a glass-tube cutter, the combination of a hollow cylindrical barrel insertable within the tube to be cut, a rotary cutter wheel supported by and in eccentric relation to the barrel to expose the cutting edge of the wheel, a longitudinally disposed leaf spring carried by the barrel at the side diametrically opposite the cutter wheel, and longitudinally movable means received through the bore of the barrel and having operative engagement with the spring for bowing the spring outwardly to apply pressure upon the inner wall of the tube being cut.

4. A glass-tube cutter comprising the combination of a hollow cylindrical barrel insertable within the tube to be cut, a laterally projecting cutter device carried by the barrel, a longitudinally disposed leaf spring also carried by the barrel to locate the same diametrically opposite from the cutter device, the ends of said spring extending approximately equal distances in opposite directions from the cutting plane of the cutter device, and means extending through the bore of the barrel into operative engagement with the spring for bowing the spring outwardly to pressure-applying engagement to the inner wall of the tube for influencing the cutter into cutting engagement with the tube.

5. A glass-tube cutter comprising the combination of a support insertable within the tube to be cut, laterally projecting cutting means carried by the support, a longitudinally disposed leaf spring carried by the support to locate the spring opposite to the cutting means, and means operatively engaging said spring for bowing the spring outwardly to pressure-applying engagement to the inner wall of the tube for influencing the cutting means into cutting engagement with the tube.

6. A glass-tube cutter comprising the combination of a support insertable within the tube to be cut, laterally projecting cutting means carried thereby, a spring carried by the support to engage the inner wall of the tube at the side opposite that engaged by the cutter, and pressure-applying means operatively engaging said spring for actuating the spring into its tube-engaging position.

7. A glass-tube cutter comprised of the combination of a support adapted to be inserted within the tube to influence the tube into cutting relation with said cutting means, said last-named means comprising a manually-operated pressure-applying rod movable longitudinally relative to the support and a pressure-transmitting member of spring characteristics directly connected with said rod for converting the longitudinal pressure of said rod to a lateral pressure upon the tube.

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