G. H. WILKINS.

GLASS TUBE CUTTER.

APPLICATION FILED AUG. 9, 1909.

996,385. **Patented June 27, 1911.**

Fig. 1.

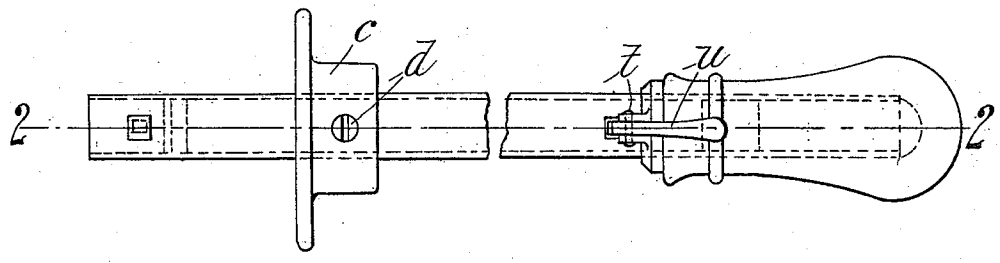


Fig. 2.

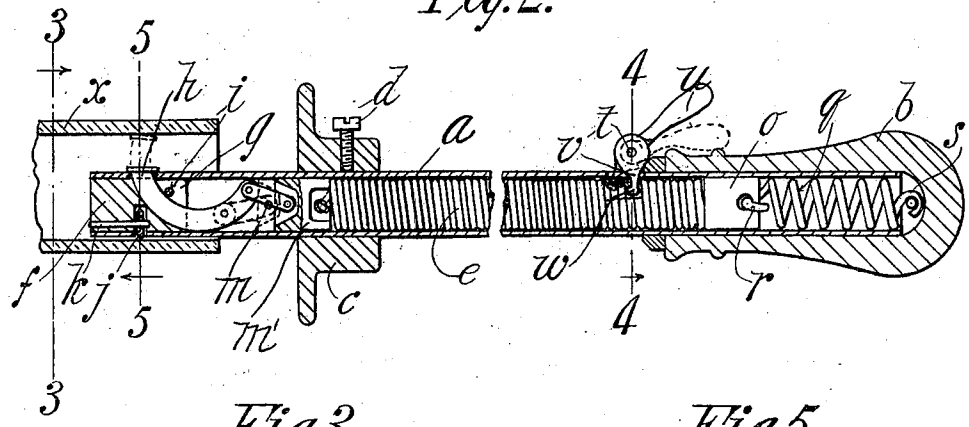


Fig. 3.

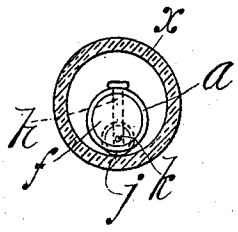


Fig. 4.

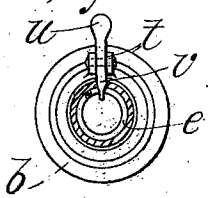
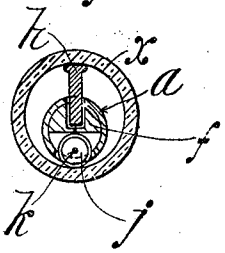


Fig. 5.



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GLASS-TUBE CUTTER.

996,385. Specification of Letters Patent. Patented June 27, 1911.

Application filed August 9, 1909. Serial No. 511,898.

To all whom it may concern:

Be it known that I, GEORGE H. WILKINS, a citizen of the United States of America, residing at Greenfield, in the county of Franklin and State of Massachusetts, have invented new and useful Improvements in Glass-Tube Cutters, of which the following is a specification.

This invention relates to improvements in glass-tube cutters and particularly to tubes that are employed for indicating the water level in steam boilers, known as "water-gage tubes".

The objects of the invention are,—(1) to provide a tool that is rigid throughout its entire length in order that when the same is used to cut a tube of considerable length and thickness, it will not bend during the cutting operation; (2) to provide a tool with a plunger element whereby any irregularities within the tube may be compensated for, said plunger element, preferably, comprising a closely coiled spring that extends substantially the entire length of the tube, the end of said spring being provided with a presser-foot which transmits the unevenness of the tube to the spring; (3) to provide a foot-piece that will directly transmit the thrust or pressure exerted on the inner surface of the tube to be cut to the cutter, whereby ease of operation may be obtained.

In the drawings forming part of this application,—Figure 1 is a plan view of the tool showing the external appearance of the same looking down upon the trigger. Fig. 2 is a longitudinal, vertical, sectional view on the line 2—2, Fig. 1, showing the closely coiled plunger spring element within the tube, the cutter, foot-piece, and the spring for withdrawing said element after the cutting operation has been completed. Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 2, looking in the direction of the arrow. Fig. 4 is a sectional view on the line 4—4, Fig. 2, showing the manner of connecting the trigger to the spring plunger element. Fig. 5 is a sectional view on the line 5—5, Fig. 2, showing the tool within the tube that is to be cut and the presser-foot engaging the inner curved surface of the tube.

Referring to the drawings in detail, *a* designates a tube or barrel element of suitable length to which is attached the handle *b* at one end. The outer surface of the barrel element *a* is provided with an adjustable collar *c* and set-screw *d* for locking the collar to the tube whereby the length of the glass-tube that is to be cut may be accurately determined. Located within the barrel element *a* is a closely coiled spring plunger element *e* that is adapted, as a whole, to be moved longitudinally back and forth within the tube *a*, although I do not exclusively limit myself to a closely coiled spring as I may use a solid plunger, if desired.

The outer end of the tube is closed by means of a plug *f*, the inner end portion of which is grooved, as shown at *g*, for receiving the bottom or lower curved edge of the presser-foot *h*. The bottom of the groove is curved to correspond with the curvature of the said foot *h*, as shown, and therefore acts so as to confine and guide its movements both into and out of the tube *a*. A pin *i* or other equivalent element extends transversely across the groove *g* and is for the purpose of retaining or confining the movements of the element *h* in the groove *g* during both its inward and outward movements.

Oppositely located in the plug *f*, with relation to the presser-foot *h* is a disk-shaped cutter *j* that is rotatably secured in the plug *f* by means of the pin *k*. To the outer end of the coiled spring plunger element *e* the presser-foot piece *h* is attached by means of a link, as shown at *m*, and to its inner end is suitably secured a block or piston element *o* to which is attached a retracting spring *q*, the opposite ends of which are attached to the piston element *o* and the handle *b*, respectively, as indicated at *r* and *s*. The spring *q* may, if desired, be a closed, coiled one. As shown, however, it is an open coiled one, and I do not limit myself to either form, as both are operative. Located intermediately of the link *m* and the outer end of the plunger *e* is a block or piston element m^1 to which the inner end of the link *m* is pivoted, and the outer end of the plunger *e* is secured, as clearly shown in Fig. 2 of the drawings.

It should be particularly observed that the link *m* is attached to the presser-foot piece *h* in such a manner, and that said foot-piece is of such a length or curvature, that the movements of this link both above and below the axial line of the tube *a* will be equal; that is to say, the thrust of the link on the presser-foot element is substantially a constant quantity.

The dotted lines indicate the position of the link and presser-foot piece *h* during the cutting operation, it being understood that the movement imparted to the foot-piece *h* is greater than the operating lever, since the outer end of the link *m* moves in an arc as well as longitudinally.

Pivotally secured to the tube or barrel element *a*, at *t*, is a trigger *u* that is provided with a downwardly extending arm or neck *v*, which is provided with an enlarged head portion *w*. The arm *v* passes between two of the coils of the closed spring plunger element *e*, as shown, the head *w* being located within the coils, whereby the trigger *u* is attached to the plunger element *e*.

Referring now to the operation of the tool: *x* designates the glass gage tube which is to be cut, as shown in Fig. 2. The tube or barrel *a* is inserted within the tube *x*, until the glass tube engages the adjustable collar *c* which has been previously locked on the tube *a* at the right distance from the cutter *j* by means of the set-screw *d*. The operator then presses the trigger *u* downward into the dotted line position, which operation forces the closed coiled spring plunger element *e* outward carrying with it the block m^1, link *m*, and the presser-foot *h* from full line position to the dotted line position and causing the same to engage the inner surface of the glass-tube *x*. Meanwhile, the operator holds the tool in one hand and the tube *x* which is to be cut in the other hand, rotating the tube as the cutting wheel is brought into operating contact with the inner wall of the tube simultaneously holding the trigger *u* downward and the presser-foot *h* in the dotted line position which directly forces the cutter *j* against the inner surface of the glass tube, whereby a groove is cut in the tube a suitable depth permitting it to be readily broken on the groove made by the cutter, in the usual manner. The spring plunger element *e* being coiled closely, furnishes sufficient space between the individual coils to produce the necessary cushioning effect for any irregularities within the tube *x*. After the tool has been removed or withdrawn, the trigger is automatically drawn backward to its full line position, together with the plunger element *e* by means of the coiled spring *q* which, at the same time, pulls the presser-foot *h* downward into the full line position shown in Fig. 2. It will therebore be seen that I have produced a glass-tube cutter, that is very rigid throughout its entire length, by reason of the use of the closed tube or barrel *a*, and also one that is elastic in the sense that its plunger element for operating the presser-foot exerts or provides a cushion for the irregularities within the tube being cut.

It is to be understood that I do not limit myself to the exclusive use of a tube element, but may, if desired, use a channel or U-shaped element.

The coils of the plunger element *e* are, in effect, a tube when the trigger is operated to the dotted line position, and furnish the necessary rigidity to move the foot-piece *h*. The plunger or closed spring element is withdrawn by means of the weak, open, coiled spring *q*.

It should be noticed that the cutter element *j* always stands at right angles to the axis of the tube being cut, and therefore prevents all danger of breakage. Also the end of the presser-foot piece *h* and the cutter *j* are always in a line that is substantially at right angles to the axis of the tube *a* whereby ease of operation is effected, and danger of breakage of the cutter is avoided.

What I claim, is:—

1. A tube cutter adapted for entrance into the tube to be cut comprising a movable member for engaging the inner surface of the tube to be cut, a cutter-supporting member, means for confining the movement of said movable member to a circular path, and means, including a link connection, for operating said tube-engaging member.

2. A gage tube cutter having in combination with a tube element, a coiled spring-plunger element located within said tube, a plug provided with a guide groove therein, a presser-foot operable from the plunger element and located within said groove, a cutter, and means for operating said plunger, substantially as described.

3. A gage tube cutter having in combination with a tube element, a closely coiled spring-plunger element located within said tube, a plug provided with a guide-groove therein, a presser-foot operable from the plunger element and located within said groove, a cutter, and means engaging the coils of the plunger element for operating said plunger, substantially as described.

4. A gage-tube cutter having in combination with a tube element, a closely coiled spring plunger element located within said tube, a plug provided with a guide-groove therein, a presser-foot operable from the plunger-element and located within said groove, a cutter, and means for operating said plunger, and an elastic element for withdrawing said plunger element, substantially as described.

5. A cutting-tool having in combination, a casing, a cutter, a plunger-controlled tube-engaging element, and means for guiding and confining the movements of said tube-engaging element, said means including a plug element having a groove therein for receiving the tube-engaging element, substantially as described.

6. In a tube-cutter, the combination with a casing thereof, a cutter element, a plunger

located in the casing, a presser-foot, and a link connection between the presser-foot and plunger.

7. In a tube-cutter, the combination with a casing thereof, a cutter element, a plunger in the casing, a presser-foot, and a connection between the presser-foot and plunger, said connection comprising a link attached respectively to the presser-foot and plunger, substantially as described.

8. In a tube-cutter, the combination with a casing thereof, a cutter element, a plunger in the casing, a presser-foot, and a connection between the presser-foot and plunger, said connection comprising a link connected respectively to the presser-foot and plunger, means for operating the plunger, and an elastic member for withdrawing the plunger, substantially as described.

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Witnesses:
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