



# UNITED STATES PATENT OFFICE.

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## FLUE-CUTTER.

SPECIFICATION forming part of Letters Patent No. 690,205, dated December 31, 1901.

Application filed April 2, 1901. Serial No. 54,060. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES AUGUST SWANSON, a citizen of the United States, and a resident of Kinbrae, in the county of Nobles and State of Minnesota, have invented a new and Improved Flue-Cutter, of which the following is a full, clear, and exact description.

This invention relates to a class of tools employed for the removal of tubes or flues from boilers by cutting the body of a flue loose from its ends that are secured in the flue-sheets, and has for its object to provide a simple practical flue-cutter of novel construction which is very effective in service and is adapted to cut off flues or tubes which vary considerably in diameter.

The invention consists in the novel construction and combination of parts, as is hereinafter described, and defined in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side view of the tool arranged for cutting tubes of small diameter. Fig. 2 is a partly-sectional edge view seen in direction of the arrow *a* in Fig. 1. Fig. 3 is a side view of parts of the device arranged for cutting larger tubes. Fig. 4 is an enlarged transverse sectional view substantially on the line 4-4 in Fig. 1, and Fig. 5 is an enlarged transverse sectional view substantially on the line 5-5 in Fig. 1.

In the drawings, 1 indicates an elongated body-bar which is mainly cylindrical and widened near one end to permit the formation of a longitudinal slot *a* in said widened portion 6<sup>a</sup>. From the outer end of the portion 6<sup>a</sup> a finger-piece 6<sup>b</sup> is extended, which is convex on the outer surface and concaved on the inner surface, a shoulder *b* defining the point of junction between the finger-piece and the enlarged and slotted portion of the body-bar.

Upon an ear 6<sup>c</sup>, formed or secured on the body-bar 6, one end of the arm 7 is jointed, as at *b'*, said arm extending at the side of the body-bar in direction of the finger-piece 6<sup>b</sup>. The arm 7 is offset at *c* to project a short limb 7<sup>a</sup> on the same toward the concave sur-

face of the finger-piece 6<sup>b</sup>, and to afford strength a concave corner or fillet is afforded at the inner side of the offset *c*, which essentially conforms with a rounded portion *c'*, formed on the inner side and lower portion of the slotted member 6<sup>a</sup>, as shown in Fig. 1. The short limb 7<sup>a</sup> is rounded in its body and for a portion of its length is reduced in diameter, producing a shoulder *d* thereon, said diametrically-reduced end portion of the limb receiving the disk cutter 8, held loosely against the shoulder *d* by a thimble *e* or equivalent device, the thimble, if employed, being secured in place by a pin *e'*, that passes through a transverse perforation in the thimble and the end portion of the limb 7<sup>a</sup>.

The disk cutter 8 is formed of steel and is circular and may have a cylindrical hub centrally perforated for engagement with the cylindric body of the limb 7<sup>a</sup>, the cutting edge being formed by cutting away the periphery of the disk, so as to leave a sharp edge at the transverse center of the disk, as is usual for such cutters.

An adjusting-bolt 9 is provided, having its body threaded throughout its length, and at one end is flattened. This flattened portion is pivoted within a slot in the arm 7, as shown at *f* in Figs. 1, 2, and 3, the body of the bolt passing loosely through the opposite slots *g*, formed in the edges of the widened member 6<sup>a</sup> of the body-bar 6.

On the adjusting-bolt 9 a nut-block 10 is mounted and occupies the longitudinal slot *a* in the portion 6<sup>a</sup> of the body-bar 6, and in the preferably circular periphery of the nut-block a series of spaced radial perforations *h* is formed for the reception of a mating end on a pin-wrench of ordinary form.

A driver-shank 11 of suitable length is connected with an end of the body-bar 6 near the ear 6<sup>c</sup> by a gimbal-joint *m*, the opposite end of the driver-shank having an angular formation *n* to adapt it for convenient engagement with a rotating device of any suitable character.

If the device is to be used to cut flues or boiler-tubes of comparatively small diameter, then the tool is arranged as shown in Figs. 1 and 2 and hereinbefore described, the oper-

ator inserting the finger-piece 6<sup>b</sup> and limb carrying the cutter 8 into the end of the flue until the shoulders *b* and *c* contact with the end of the flue held within a flue-sheet. (Not shown.) The arm 7 is now moved away from the body-bar 6 by rotatable adjustment of the nut-block 10 in a proper direction, which will forcibly impinge the sharp edge of the disk cutter 8 against the inner surface of the flue, which will be cut by rotary movement of the tool effected by power applied at the end *n* of the driver-shank 11, it being understood that as occasion requires the nut-block 10 is rotatably adjusted to continue pressure of the disk cutter 8 on the flue until the latter is cut through its wall. When the flues are cut loose at one end, the operation is to be conducted at their opposite ends, as has been described, which will obviously release the flues from the flue-sheets of the boiler.

By providing a gimbal-joint *m* between the driver-shank 11 and the adjacent end of the body-bar 6 the flue-cutter may be very conveniently operated upon flues that are positioned close to the inner side of the boiler-shell, as then the driver-shank may be effectively actuated at an angle to the body-bar and away from the boiler-shell.

When the flue-cutter is to be used for cutting off flues of considerable diameter, it is then arranged as shown in Fig. 3, wherein it will be seen that the arm 7 is reversed in position by turning it over, so that the offset portion thereon projects outward or away from the finger-piece 6<sup>b</sup>. To effect this adjustment of parts, the pivots *b'* and *f* are removed and subsequently replaced after the arm has been reversed in position, which will so remove the cutter 8 as to adapt it for increased divergence from the finger-piece 6<sup>b</sup> and obvious contact with the inner surfaces of flues having considerable diameter.

It is claimed that the improved flue-cutter is very simple, strong, and of compact construction, is readily applied within flues having a wide difference in diameters, and that it will operate effectively in places where ordinary tools for the purpose are very inconvenient to use.

Having thus fully described my invention,

I claim as new and desire to secure by Letters Patent—

1. A flue-cutter, comprising a body-bar having a slot, an arm hinged by one end on a projection from the body-bar, an offset portion on the arm near the free end, a cutter held to rotate on said offset portion, a transverse screw passing loosely through the body-bar across the slot, a nut on the screw held loosely in the slot, said screw engaging the arm for its lateral adjustment, a driver-shank, and a gimbal-joint between adjacent ends of the driver-shank and body-bar.

2. A flue-cutter, comprising an elongated body-bar, an arm pivoted by one end on an ear extended from a side of the body-bar, an offset portion on the free end of the arm, a rotatable disk cutter loosely held on said offset portion, a threaded adjusting-bolt pivoted by one end on the arm above its offset, said bolt passing loosely through the body-bar near one end, an adjusting-nut block mounted on the bolt and occupying a slot in the body-bar, and means to loosely connect one end of the body-bar with a rotating device.

3. A flue-cutter, comprising an elongated body-bar, a widened portion thereon near one end and having a longitudinal slot in said widened portion, a finger-piece on the end of the body-bar adjacent to the slot, an arm pivoted by one end on an ear extended from a side of the body-bar, an offset portion on the free end of the arm, a rotatable disk cutter loosely held on said offset portion, a threaded bolt pivoted by one end on the arm above the offset, said bolt passing loosely through the body-bar at right angles to its elongated slot, an adjusting-nut block mounted on the bolt and occupying said slot, and a driving-shank connected loosely with an end of the body-bar so as to be angularly adjusted in different directions.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES AUGUST SWANSON.

Witnesses:

J. H. JOHNSON,  
HAKIN JOHNSON.