

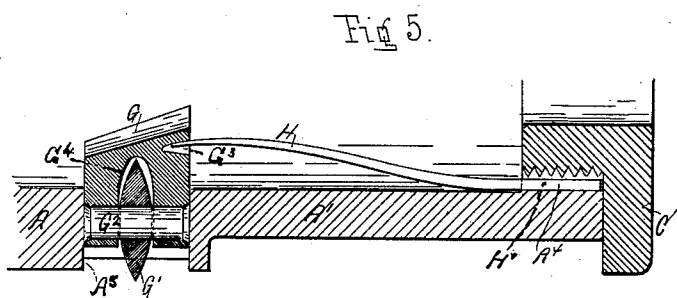
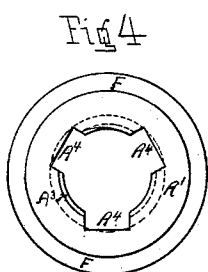
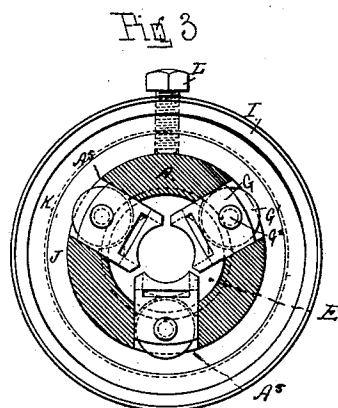
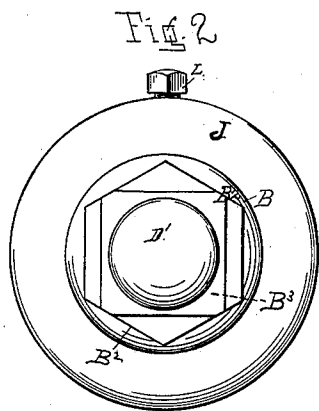
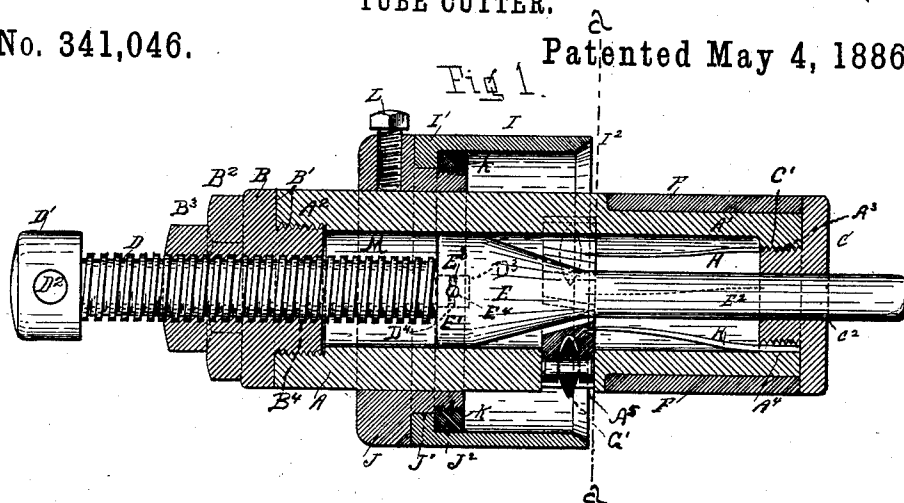
(No Model.)

E. H. & G. E. NUEBLING.

TUBE CUTTER.

No. 341,046.

Patented May 4, 1886.



Witnesses
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ERNST H. NUEBLING AND GEORGE E. NUEBLING, OF READING, PA.

TUBE-CUTTER.

SPECIFICATION forming part of Letters Patent No. 341,046, dated May 4, 1886.

Application filed February 16, 1886. Serial No. 192,079. (No model.)

To all whom it may concern:

Be it known that we, ERNST H. NUEBLING and GEORGE E. NUEBLING, citizens of the United States, residing at the city of Reading, county of Berks, State of Pennsylvania, have invented a new and useful Improvement in Boiler-Tube Cutters, of which the following is a specification.

This improvement relates to the class of tube-cutters principally intended for cutting off the tubes while secured in the tube-sheet.

The object of the improvement is to furnish a tool adapted to the purpose which, while not expensive to construct, will readily cut the tubes free from the sheet.

The drawings herewith, forming a part of this specification, illustrate very clearly the chief points of our invention, like letters of reference indicating like parts throughout.

Figure 1 represents in longitudinal sectional elevation our improved boiler-tube cutter; Fig. 2, an elevation of the operating end of the tool. Fig. 3 is a transverse sectional elevation upon the line *a a* of Fig. 1; and Fig. 4 is an end view of the tool, with the cap C removed to show the seats *A*⁴ for the housing-springs of cutters G; Fig. 5, an enlarged detail sketch of the anti-frictional roller-sleeve end of the tool, showing the spring H in its seat retained by the cap C, and the connection of the same with the housings of the cutter, in which—

A represents the shell or body of the tool; *A*³, a threaded end for the combined cap and nut; C, a cap and guide for the inner end of the body; *A*¹, a reduced portion providing a seat for the anti-frictional roller-sleeve; *A*⁴, recesses sunk in the bore of the inner end, forming seats for the cutter-housing springs, and the shell is cut through at three equidistant points, *A*⁵, fitted to form protrusion guides for the housings G of the cutters G¹.

B represents the cap-nut threaded at B¹ to fit the body at *A*², having a hexagonal offset, B², and a square offset, B³, with a thread, B⁴, adapted to the feed-screw D.

C represents the end cap threaded at C¹ to fit the end *A*³ of the shell, and acting as a retainer to the anti-friction sleeve F, (the latter bored to play free without looseness on the reduced portion *A*¹ of the shell,) and bored at

C² as a guide to the stem E² of the expanders E, having a flat portion, E¹, as a guide to the same within the bore of the shell, a counter-bore, E³, for connection with the feed-screw, and a flush screw, E⁴, removably connecting it with the same.

D represents the feeding-screw, provided with a left-hand thread adapted to the cap-nut, having a head, D¹, suitably bored at D², for the means of holding the screw, at its inner end having a reduced portion, D³, with a groove, D⁴, in the same, in which the end of the screw E⁴ is held, and which enables the operator to retract the expansion-bar, and thus permit the retraction of the cutters within the shell, and the withdrawal of the tool from the tube-sheet.

G represents the usual housing for a pipe-cutter wheel, G¹, which is revolvably held in a recess provided therefor by the pin G². A recess, G³, is provided as a seat for the end of the spring H, which has its opposite end, H¹, secured in the seats *A*⁴ by the cap C. These springs serve to keep the wheel-housings G in close contact with the expansion-bar, and thus follow the movement of the same.

I represents a gage by which the position of the cutters G¹ relative to the tube-sheet are regulated. It is an annular ring having an internal flange, I¹, fitted to a sliding head, J, having a reduced threaded portion, J², over which the flange I¹ is slipped, and is retained in place by an annular nut, K. A set-screw, L, retains the gage in position.

The space M left between the head of the bar E¹ and the cap end B¹ is adapted to form a reservoir for lubricating material.

The operation of the tool is as follows, (the body of the same being adapted to the internal diameter of the tube to be operated on:) The gage I is adjusted so that when resting against the tube-sheet or with the end of the tube snug against the annular nut K the edge of the cutters shall project the requisite distance within the same to cut the tube at the desired point, and the set-screw L tightened up. The body is then inserted within the tube, and the same is revolved toward the right by a wrench applied to the square projection B³, if there is room for a complete circuit of the end of the same, if not the wrench is trans-

ferred to the hexagonal projection B², which gives an opportunity to operate close up to the shell of the fire or smoke box as the case may be. While turning the body to the right, as described, the screw D is held stationary 5 by the other hand. The nut B¹ will then operate to draw the screw within the bore, which will shove the expansion-bar forward and drive out the housings and cutters. This alternate 10 feeding forward is repeated as requisite to force the cutters completely through the tube while revolving within the same. Very little force is requisite to do the feeding. When the tube is cut off, the tool is held stationary, and 15 the motion of the feed-screw reversed. This draws the expansive head toward the nut, and the springs H, pressing down the housings G upon the bar, retract the same within the shell until the cutters G' are also concealed within the same, when the tool is 20 withdrawn and the operation repeated until all the tubes are freed at one end. When the tool is transferred to the opposite end of the boiler, and as the several ends are cut the 25 tubes drop in the boiler and are removed therefrom by the usual hand-holes provided therefor.

It will be seen that our tube-cutter is simple in its construction, without liability to 30 disarrangement of parts, the strain upon the same well sustained, and it is easily operated. We prefer to make the expansion-bar E, housings G, cutters G', and anti-friction sleeve F of the best tempered steel. As expansion- 35 bars for forcing radially outward the cutters of both boring and tube-cutting tools are old, we therefore only make claim to our special combination of the same with the body of the tool.

40 We are aware of much that has been done in this class of tools, and would refer, as an example, to a patent to Frederick L. Kolberg, No. 301,130, July 1, 1884, our improvement differing from his in that our gage 45 admits of a wider range of adjustment and

requires no temporary immovable connection with the tube to be cut, our tool, from the length of the shell protruded within the tubes, giving ample support and steadiness to the same, and the anti-friction sleeve F permitting the free movement of the body within 50 the tube. In the Kolberg case there is no provision for retracting the cutters within the shell, and there will be a difficulty in withdrawing the tool. This we provide for with 55 our spring-connection with the cutter-housings, as shown and described.

By a change in the form of cutters to that of expanders our machine could be adapted to both purposes; but we prefer to retain it as 60 a simple cutter.

Having described our improvement, shown its use and advantages, we desire to secure by Letters Patent the following claims thereon:

1. The combination, in a tube-cutter, of an 65 expansion-bar, its housings and cutters, as shown and described, with a revolving body, A, provided with an anti-friction sleeve, F, a retaining-cap, C, and adjustable gage I, with a nut-cap and feeding-screw, substantially as 70 and for the purpose set forth.

2. The combination, with a tube-cutter, as described, and provided with a reduced portion, A', of an anti-friction sleeve, F, retained in position free to revolve upon the same by 75 the projected flange of the cap C, as shown, and for the purpose set forth.

3. The combination, with a tube-cutter, as shown and described, of an adjustable gage, I, having an internal flange, I', removably 80 held upon a reduced portion, J', of the head J, by an annular nut, K, and adjustably secured upon the body A by set-screw L, as and for the purpose described.

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Witnesses:

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