S. ENGEL.

TUBE-EXPANDER AND CUTTER.

No. 184,602. Patented Nov. 21, 1876.

Fig. 1.

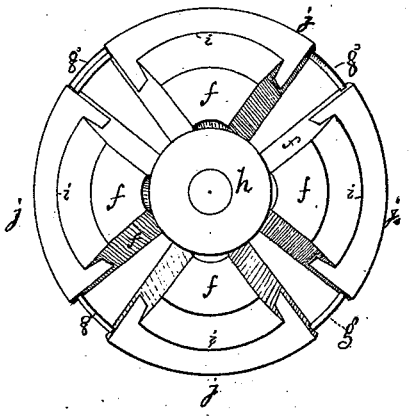
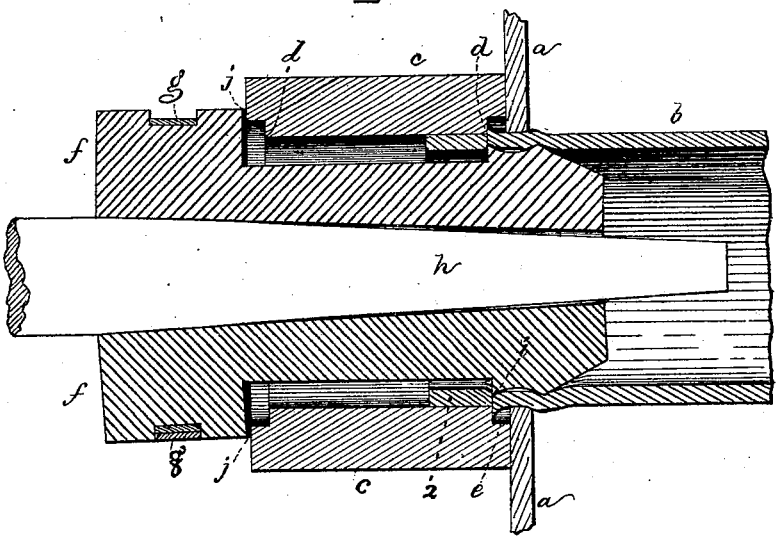


Fig. 2.



Witnesses:
Lott. Latimer
W. J. Pratt.

Inventor:
Stephan Engel
per Crosby & Gregory Attys.

UNITED STATES PATENT OFFICE.

STEPHAN ENGEL, OF CAMBRIDGEPORT, MASSACHUSETTS.

IMPROVEMENT IN TUBE EXPANDERS AND CUTTERS.

Specification forming part of Letters Patent No. **184,602**, dated November 21, 1876; application filed September 22, 1876.

To all whom it may concern:

Be it known that I, STEPHAN ENGEL, of Cambridgeport, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Tool for Cutting Off and Expanding Boiler-Tubes, of which the following is a specification:

This invention relates to tools for cutting off and expanding boiler-tubes; and the invention consists in an expander composed of a series of sectors and provided with cutting-edges, in combination with a tube-surrounding collar provided with a cutting-edge, substantially as described.

Figure 1 represents the cutter and expander in end view, the parts being expanded; and Fig. 2 represents the cutter, and expander, and holder, and a tube and boiler-head, in section.

The boiler-head *a* is provided with suitable openings to receive the boiler-tubes *b*, one only being shown, the end of the tube projecting beyond the end of the head *a*, to receive the collar *c*. This collar has, preferably, at each end, a cutting-edge, *d*, formed by removing a portion of the interior of the collar, leaving an annular space, *e*. The expander is composed of four or more sector-like sections, *f*, held together, preferably, by a steel band, *g*, that will permit the sections to move radially or expand under the action of the tapering mandrel *h*. The concaved portion of the sections *f* acts to expand the tube about the contiguous portions of the boiler-head, as usual. I provide these sections with a cutting-edge, *i*, thereby making the expander a cutter for the tubes, the edges *i* working in opposition to the annular edge *d* on the collar.

To expand and cut off a tube, the collar is placed over the end of the tube and against the boiler end *a*. The expander and cutter is then inserted within the tube until the gages *j*, which are shown as shoulders on the sections, meet the end of the collar, in which position the cutting-edges *i* are in proper position with reference to the cutting-edge of the collar. In this position the tapering mandrel is driven in, and from time to time rotated until a suitable portion of the end of the projecting tube is cut off, and the tube at the head is properly expanded.

In practice, about one-eighth of an inch of the tube end is left projecting beyond the head *a*, and the piece cut off is left within the collar, as at 2. When the collar and tube are removed, the projecting end is properly calked against the head.

Without the gage *j* it would be quite difficult to place the cutting-edges *i* properly with relation to the edge *d*.

Each end of the collar is preferably provided with a cutting-edge, and they may be adapted to cut tubes of different sizes.

I claim—

1. The expander composed of sections *f*, provided with cutting-edges *i* and the band *g*, in combination with a collar provided with a cutting-edge, *d*, substantially as and for the purpose set forth.

2. The sections *f* of the expander, provided with cutting-edges *i* and the gages *j*, in combination with the collar *c*, provided with a cutting-edge, all adapted to operate to cut and expand the tube, substantially as set forth.

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

STEPHAN ENGEL.

Witnesses:

G. W. GREGORY,

L. H. LATIMER.