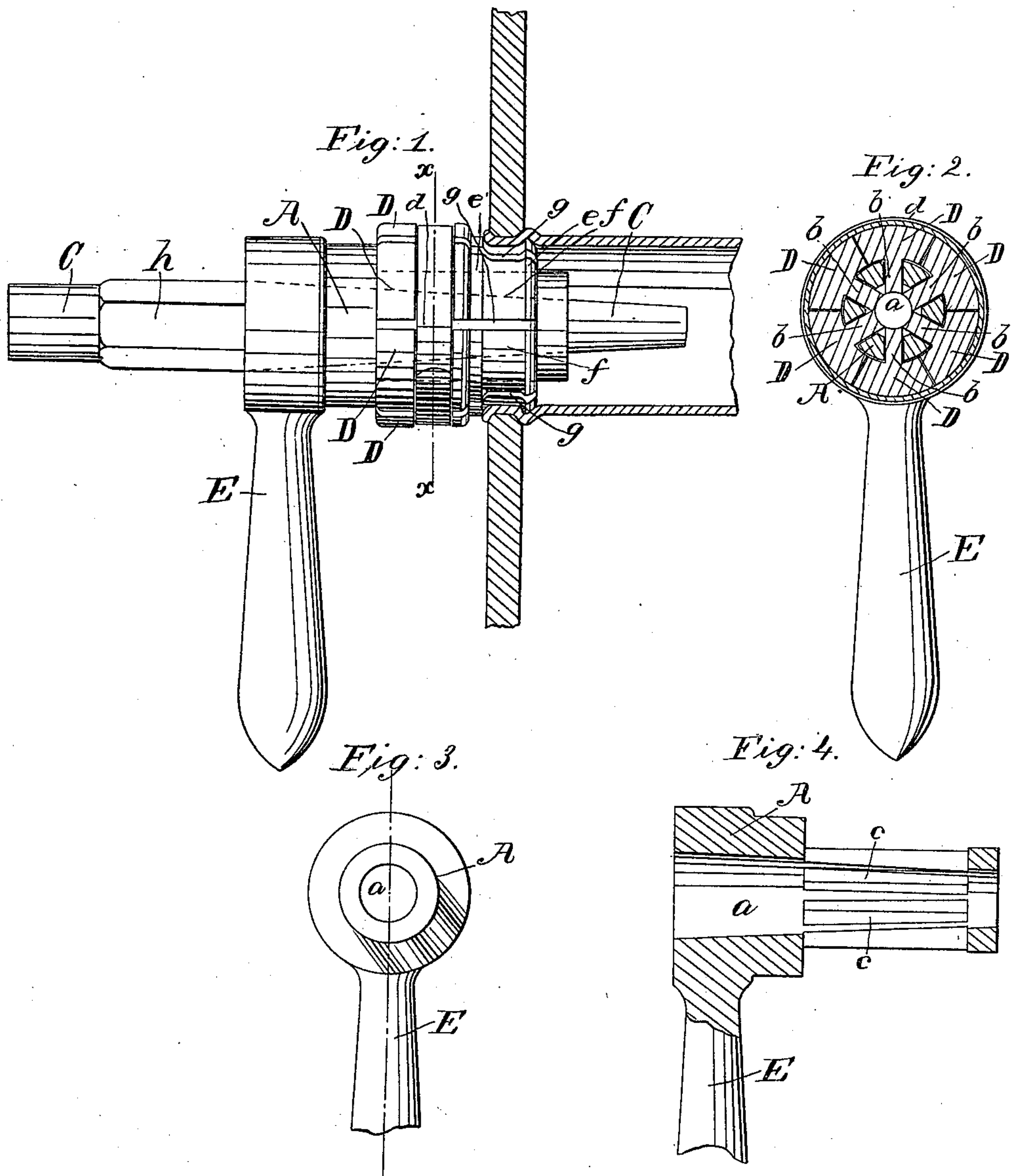


*A. Van Guysling,
Pipe Expander.*

N^o 40,967.

Patented Dec. 15, 1863.



*Witnesses;
J. W. Combs
Geo. W. Reed*

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UNITED STATES PATENT OFFICE.

AARON VAN GUYSLING, OF NORTH GREENBUSH, NEW YORK.

IMPROVEMENT IN TOOLS FOR FASTENING BOILER-TUBES.

Specification forming part of Letters Patent No. 40,962, dated December 15, 1863.

To all whom it may concern:

Be it known that I, AARON VAN GUYSLING, of North Greenbush, in the county of Rensselaer and State of New York, have invented a new and Improved Tool for Fastening Boiler-Tubes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a side elevation of my invention, showing its application to a boiler. Fig. 2 is a transverse vertical section of the same, the line *x x*, Fig. 1, indicating the plane of section. Fig. 3. is an end elevation of the slotted sleeve detached. Fig. 4 is a longitudinal central section of the same.

Similar letters of reference in the several views indicate corresponding parts.

This invention is intended as an improvement on a tool for attaching tubes to boilers, on which a patent was granted to Thomas Prosser, April 17, 1849.

The improvement relates to the slotted sleeve which forms the guide for the segmental expanders, and which is provided with a handle, so that after the conical mandrel has been inserted the tool can be turned, and that by this action the joint between the tube and the tube-sheet is rendered smooth, free from ridges or wrinkles, and perfectly tight. Furthermore, instead of making the conical mandrel round from end to end, and to facilitate its removal from the sleeve, in the improved tool it (the mandrel) is provided with a square or polygonal head, so that a wrench can be applied, and that it can be removed from the sleeve simply by turning it round and without the use of a hammer.

To enable others skilled in the art to make and use my invention, I will proceed to describe it.

A represents a sleeve made of cast-iron or any other suitable material, and provided with a conical hole, *a*, which forms the guide for the tapering mandrel C. This mandrel is made of steel, and it serves to act on the segmental expanders D. Each of these expanders is guided by a flange, *b*, projecting through one of the slots, *c*, in the sleeve, and they are so shaped that the same when not expanded leave no gaps between their adjoining edges, and when expanded they completely embrace

the inner surface of the tube, with the exception of very narrow strips opposite the gaps, which necessarily will open between the adjoining edges of the expanders when the mandrel is driven in. As the mandrel is driven into the hole *a*, it comes in contact with the inner edges of said flanges and forces the expanders out. A spring, *d*, which embraces the expanders, causes them to resume their original position as soon as the conical mandrel is withdrawn. The expanders are provided with double projections, *e e'*, having a hollow or neck, *f*, between them, and in order to fasten a tube to a tube-sheet the tube is introduced into the mouth of the pipe just far enough to bring the neck *f* opposite the edge of the tube-sheet, leaving the projections *e e'* one inside and the other out, and the conical mandrel is driven into the sleeve so as to force the expanders out. By this action the projection *e'* forces the end of the tube over the outer edge of the tube-sheet, and the projection *e* causes the tube to bulge out close on the inner edge of the tube-sheet, as clearly shown in Fig. 1 of the drawings, and the tube is firmly held in place. In forcing out the expanders the edges of the same are separated, and gaps *g* are opened between them, and those portions of the tube which are opposite to these gaps are liable to become wrinkled and to leave an open passage between the edge of the tube-sheet and the outer surface of said tube and to produce a bad and leaky joint. This difficulty I have obviated by the application of the handle E to the sleeve, and after the mandrel has been driven into said sleeve and the tube secured in the tube-sheet, I take hold of this handle and turn the tool in either direction sufficiently far to bring the surfaces of the expanders to bear on the wrinkles or creases formed by the gaps between said expanders, and thereby these wrinkles are smoothed down and a tight joint is produced between the tube and the tube-sheet.

The conical mandrel C, in order to facilitate its removal from the sleeve after the tube is fastened in its place, is provided with a square or polygonal head, *h*, so that a wrench can be applied and by simply turning the mandrel it is readily loosened and taken out. Without this head the mandrel has to be loosened by tapping it laterally with the hammer, and by the jar produced by these taps the joint be-

tween the tube and tube-sheet is rendered loose and leaky. By turning the mandrel no jar is produced, and the joint between the tube and tube-sheet, if once tight, will not be liable to become leaky by the operation of removing the mandrel.

My tool can be easily applied to all the tubes in an ordinary locomotive or tubular boiler, the sleeve being so constructed that the expanders can be introduced without difficulty into the extreme tubes next to the circumference of the tube-sheet, as well as to those toward or in the center of the same, and the operation of fastening the tubes can be accomplished in a comparatively short time and without the liability of producing leaky joints.

Disclaiming all and everything shown and described in the Letters Patent of Thomas

Prosser, dated April 17, 1849, what I claim as new, and desire to secure by Letters Patent, is—

1. The application of the handle F to the sleeve A, to operate in combination with the segmental expanders D and conical mandrel C, in the manner and for the purpose substantially as described.

2. So arranging the segmental expanders D in relation to each other and to the sleeve A that the same when not expanded leave no gaps between their adjoining edges, and when expanded they embrace the largest possible part of the inner surface of the tube, as set forth.

AARON VAN GUYSLING.

Witnesses:

JAMES A. PRATT,
JOHN H. ADAMS.