

*E. Clark,
Pipe Expander.*

No 39,717.

Patented Sep. 1, 1863.

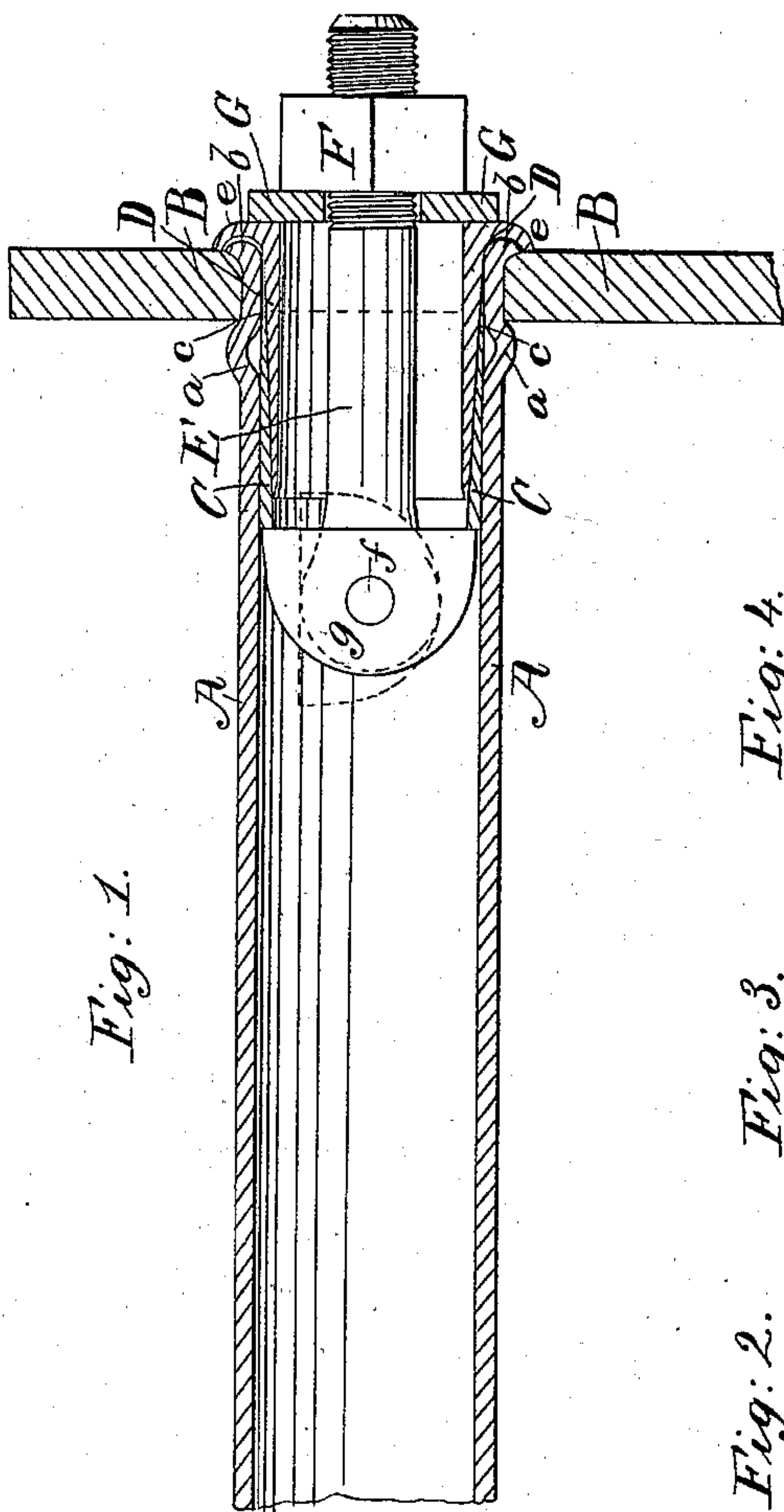


Fig: 1.

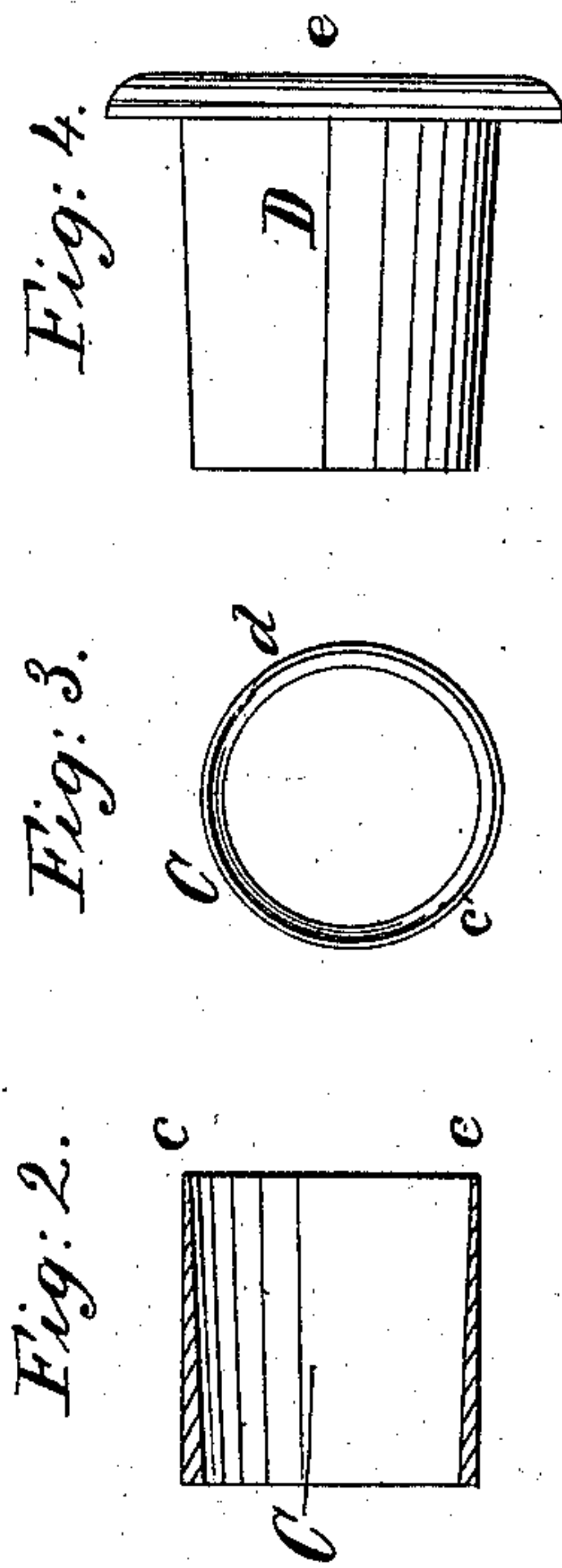


Fig: 2.

Fig: 3.

Fig: 4.

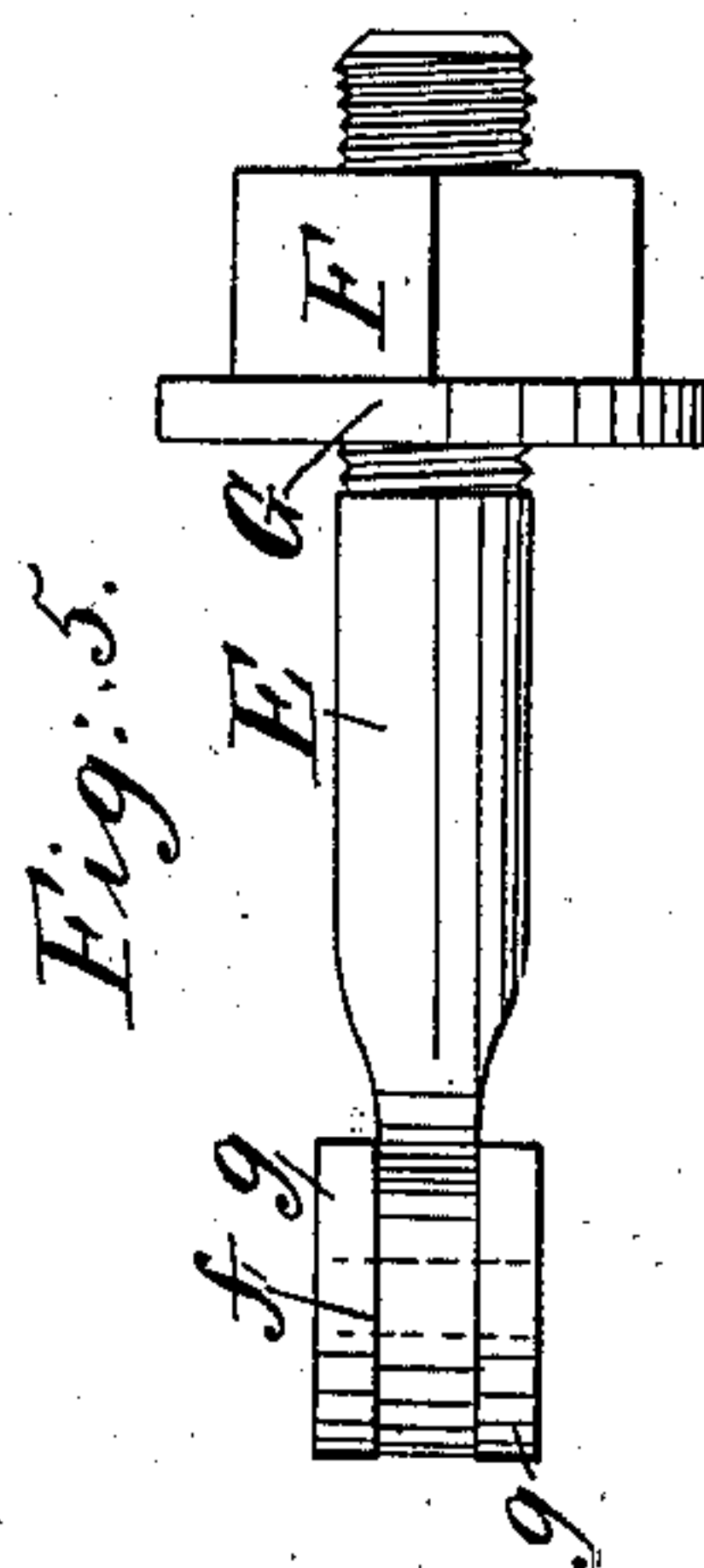


Fig: 5.

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UNITED STATES PATENT OFFICE.

EDWARD CLARK, OF NEW YORK, N. Y.

IMPROVED DEVICE FOR REPAIRING BOILER-TUBES.

Specification forming part of Letters Patent No. 39,717, dated September 1, 1863.

To all whom it may concern:

Be it known that I, EDWARD CLARK, of the city, county, and State of New York, have invented a new and improved device for repairing the tubes and flues of boilers and other tubular steam or water apparatus; 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 part of this specification.

The tubes and flues of steam-boilers and other steam and water apparatus generally give way or leak first at their connection with the tube-sheet or near their mouths. My invention consists in the combination of what I term a "spring-gland," composed of a split ring of wrought-iron, or other suitable metal, having a cylindrical exterior and conical interior, and a flanged thimble of cast or malleable iron having a conical exterior, so applied within the mouth of the tube or flue that the thimble expands the gland against the interior of the tube or flue and makes it close the leak.

Figure 1 in the drawings represents a longitudinal section of a portion of a tube and corresponding section of the tube sheet and of the gland and thimble, and a side view of the apparatus by which the gland is drawn into its place. Fig. 2 is an axial section of the spring-gland. Fig. 3 is an edge view of the same. Fig. 4 is a side view of the thimble. Fig. 5 is a longitudinal view of the contrivance for drawing the gland into place, taken at right angles to Fig. 1.

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

A is the tube, inserted into the tube-sheet B and secured in the usual manner by expanding or bulging it out, as shown at *a a* in Fig. 1, on the inner side of the tube sheet, and turning over its end, as shown at *b b* in the same figure, into a countersink on the outer side of the sheet. C is the spring-gland, made of a strip of wrought-iron forged into a taper form in its transverse section, with one edge, *c*, quite thin, scarfed at the ends, and rolled up to form a ring with a lap-joint, *d*, and with its exterior of cylindrical form and of such size as to enable it to be sprung into the tube A, and with its interior of conical form. D is the thimble, of malleable cast-iron, with a hollow flange, *e*, to fit over the end *b b* of the tube, and against the tube-sheet. The exterior of this thimble is of conical form, corresponding with the interior of the gland C, its

largest part being large enough to fit easily into the interior of the tube.

The apparatus for drawing the gland C into its place consists of a screw-bolt, E, fitted into a nut, F, and washer G, and having pivoted to it, by a pin, *f*, a head composed of two pieces of plate, (iron or steel,) *g g*, of nearly semicircular form, the extreme length of which is just sufficient to enable them to pass easily along the tube A.

In applying my invention the gland is first inserted into the mouth of the tube, with its thicker edge inward, to such a distance that its thinner edge, *c*, is within or beyond the bulged or expanded portion *a* of the tube, and then the thimble D is inserted into the tube and gland with its flange *e* up to the tube-sheet. The bolt E is then inserted without its nut and washer, and with its head *g g* in the position shown in Fig. 1 in red outline—that is to say, with its greatest width lengthwise of the tube—so far that its head passes the gland C, and then the head is turned by means of a stick or rod inserted through the thimble, to bring its greatest width across the tube, and its washer and nut are put on and the nut screwed up to make the head draw against the inner edge of the gland and draw the gland over the thimble till its outer thin edge passes the bulged or expanded portion *a*, and the gland is so expanded within the tube as to close any leakage. I generally coat the gland both inside and outside, and the thimble outside, with a cement composed of red and white lead, with a small quantity of fine cast-iron borings, the better to insure the perfect closing of the leak. After the gland has been brought into its place, the nut F is slackened and run back sufficiently to enable the head *g g* of the bolt E to be turned to the position shown in red outline in Fig. 1, and the bolt is then drawn out.

Instead of the bolt E being inserted after the gland and thimble, it may be inserted before them, and perhaps this latter method may be found most convenient.

What I claim as my invention, and desire to secure by Letters Patent, is—

The spring-gland C and thimble D, constructed and applied in combination with each other and with the tube or flue A, substantially as herein specified.

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