

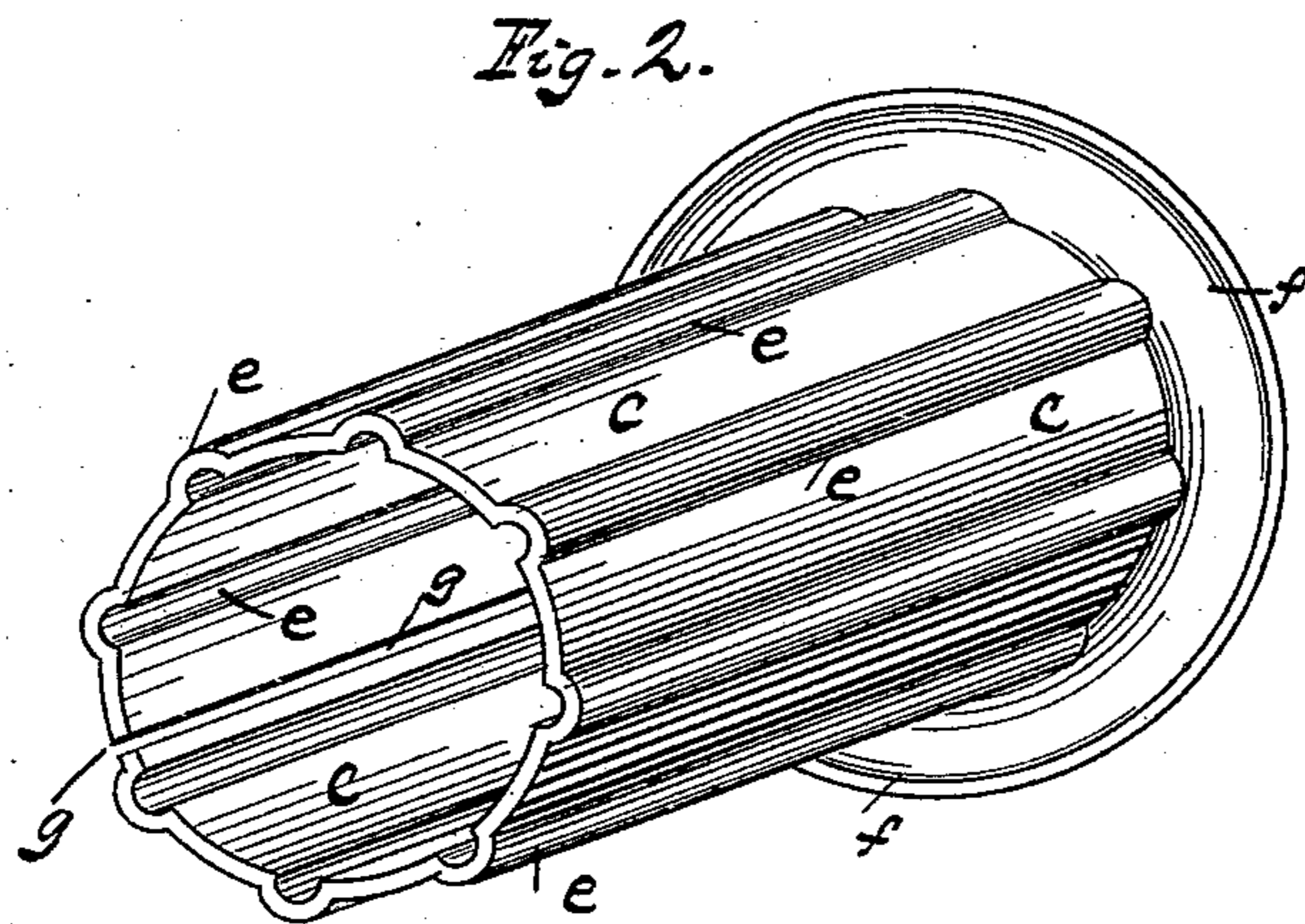
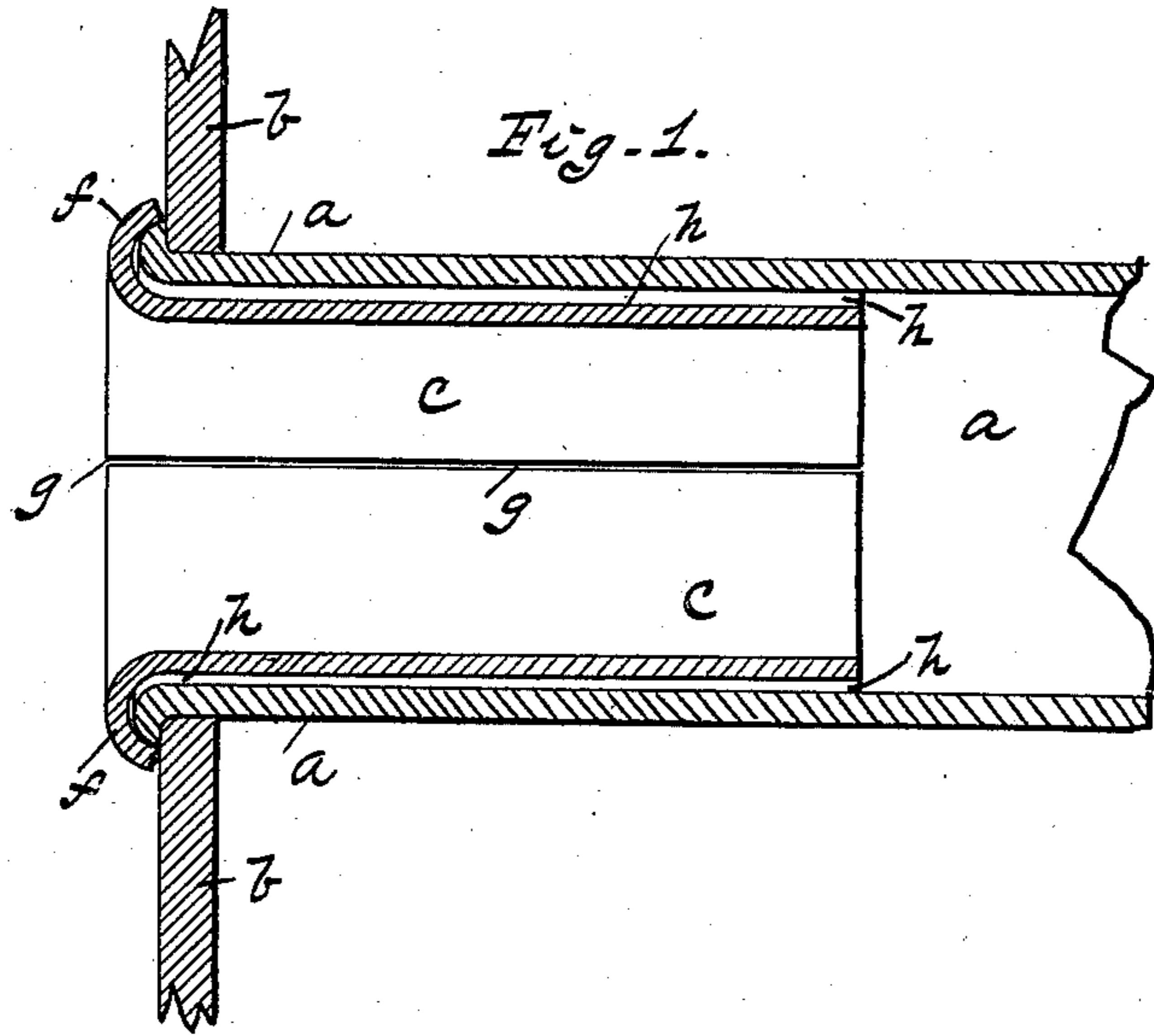
(No Model.)

W. HAGUE & W. B. COOKSON.

DEVICE FOR PROTECTING BOILER TUBES.

No. 370,865.

Patented Oct. 4, 1887.



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# UNITED STATES PATENT OFFICE.

WALTER HAGUE AND WILLIAM BOWMAN COOKSON, OF PITTSBURG, ASSIGNORS OF ONE-THIRD TO JOHN OMMERT, OF ALLEGHENY COUNTY, PENNSYLVANIA.

## DEVICE FOR PROTECTING BOILER-TUBES.

SPECIFICATION forming part of Letters Patent No. 370,865, dated October 4, 1887.

Application filed June 22, 1887. Serial No. 242,173. (No model.)

*To all whom it may concern:*

Be it known that we, WALTER HAGUE and WILLIAM BOWMAN COOKSON, citizens of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Device for Protecting the Front Portions of Boiler-Tubes; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Our invention relates to an improved device for protecting and equalizing the temperature of the front portion of boiler-tubes, the object being to provide a means whereby that portion of the boiler-tubes subjected to the greatest heat may be protected or shielded, thereby to some extent equalizing the temperature of the tubes, which allows the same to expand and contract more evenly, which being the case will prevent leakage at that point; and with this end in view our invention consists in a corrugated shield or inner cover placed in the end of each tube at the point of connection with the fire-box of the boiler, together with certain details of construction and combination of parts, as will be fully described hereinafter.

In the accompanying drawings, Figure 1 is a sectional elevation of a portion of a boiler-tube attached to the rear wall of a fire-box—such as are now in common use—and having attached thereto one of our improved protectors constructed in accordance with our invention. Fig. 2 is a perspective view of our improvement detached from the tube.

To put our invention into practice with the ordinary boiler-tubes, *a*, attached to the rear wall, *b*, of a fire box forming a part of a locomotive or other boiler, we provide a short section of a tube, *c*, somewhat less in diameter than the boiler-tubes. The section *c* is corrugated at *e* in the direction of its length and provided with an outwardly-projecting flange, *f*. This section *c* we divide by a single cut, *g*, extending lengthwise of the same, for the double purpose of allowing the section *c* to freely expand and contract and be easily entered into the tubes *a*.

If desired, the sections *c* may be constructed without the corrugations *e*, as a plain surface will answer the purpose.

In all tubular boilers it has been ascertained by actual practice that the first leakage of the boiler will take place at the intersection of the front portion of the tubes *a* with the fire-box, which portions are subjected to an intense heat, being in close contact with the fire, therefore expanding and contracting unevenly with the other part of the tubes *a*. To obviate this we secure a shield or protector, *c*, such as described, in each of the tubes *a* at a point where the same is secured to the fire-chamber. The corrugations *e* along the sides of the shield *c* serve to hold the same away from the inner wall of the tube *a*, leaving a space, *h*, through which a current of air may circulate, thus protecting the tubes *a* and equalizing the temperature of the same.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

In combination with a boiler fire tube, the corrugated section *c*, provided with an outwardly-projecting flange, *f*, and cut or divided along one side in the direction of its length, as and for the purpose described.

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Witnesses:

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