S. Wethered,

Protecting Steam-Boiler Flues.

No. 43,938. Patented Aug. 23, 1864.

Fig. 1

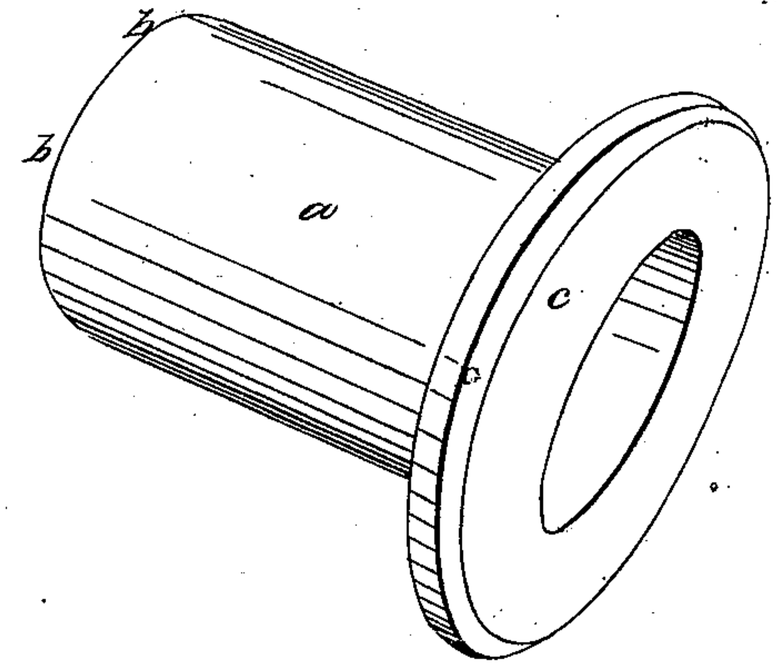


Fig. 2

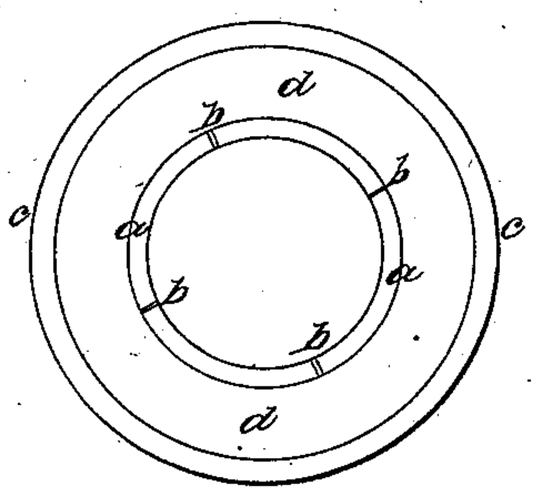
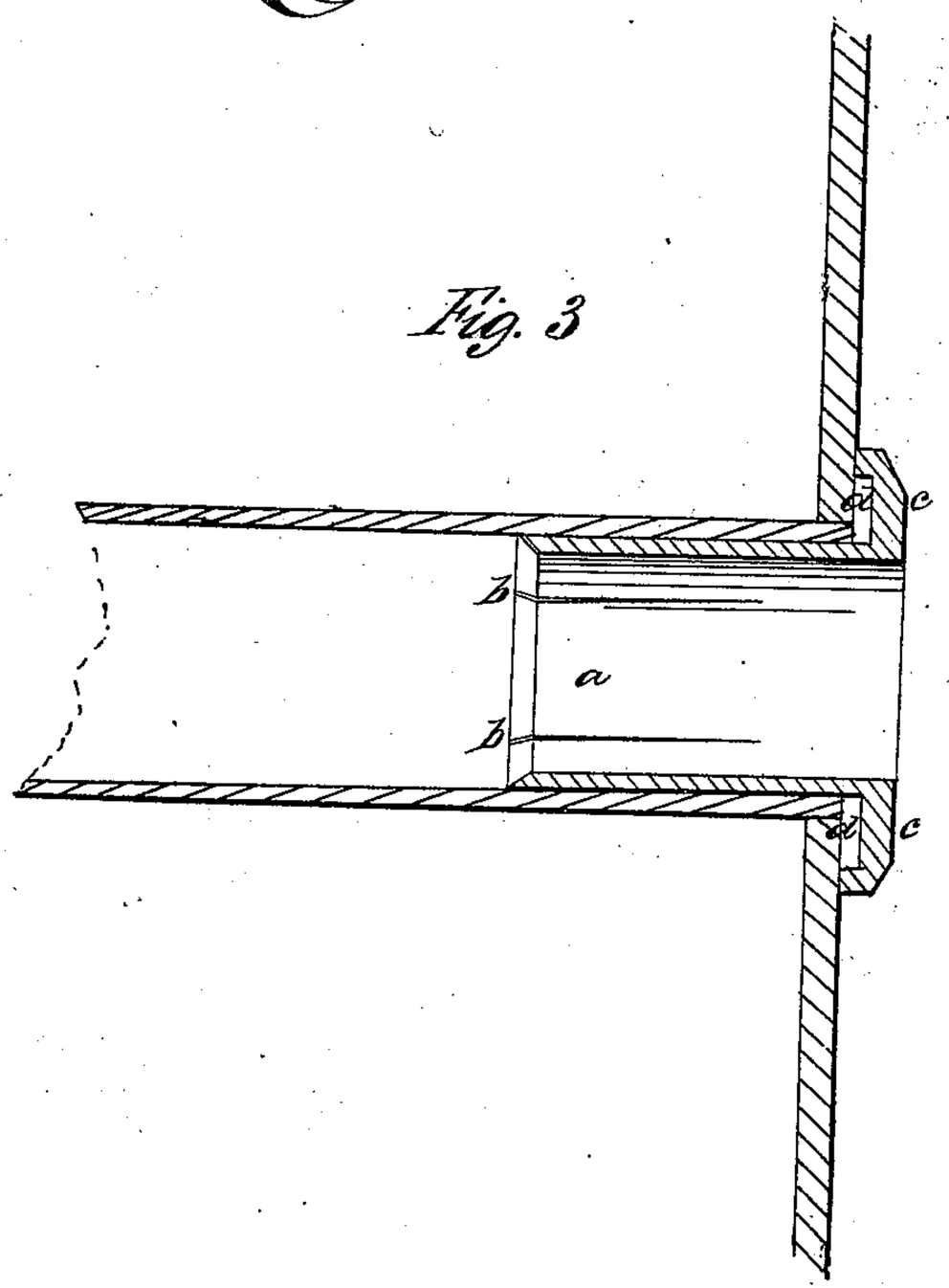


Fig. 3



Witnesses
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UNITED STATES PATENT OFFICE.

SAMUEL WETHERED, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN THIMBLES FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **43,938,** da'ed August 23, 1864.

To all whom it may concern:

Be it known that I, SAMUEL WETHERED, of Baltimore, Baltimore county, State of Maryland, have invented a new Device for Protecting the Ends of Flues; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of my invention. Figure 2 is an end view, and Fig. 3 represents a longitudinal section of my invention applied to the end of a flue or tube.

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

The object of my invention is to protect the ends of tubes or flues in tubular steam-boilers and superheaters from rapid destruction, caused chiefly by the intense heat to which they are subjected, and to effect this object by means of self-adjusting devices applied to the tubes, substantially as will be hereinafter described.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation.

The device which I have invented consists of a cylindrical or tubular portion, *a*, which may be made of any desired length and of such diameter as will enter the ends of the boiler-flues and fit tightly therein. To make this tubular portion *a* fit tightly within the flue-tube, I split it longitudinally, as shown at *b b* in Figs. 2 and 3, so that when inserted into a flue the split portions will spring outward and press against its surface, and thus the device will hold itself in place, and may be removed at pleasure for cleaning out the soot and cinders from the flue. On one end of this split cylinder *a* a circular flange, *c*, is formed or applied in any suitable manner, and on the inside surface of this flange an annular groove or depression, *d*, is formed, the object of which is to receive that portion of the flue-tube which projects outside, or from the outside surface of the flue-sheet, as shown in Fig. 3.

In that class of boilers where the heat is applied outside of the flue-tubes the flanged thimbles which I have above described will be passed over the tubes and the flanges drawn down snugly against the sheets, and, if desired or found necessary, cement and bolts, or both, may be employed to keep the thimbles in place.

In the application of my thimbles to this class of boilers the groove or depression *d* will of course be formed on the outer surface of the flange *c*, in order to allow the end of the thimble to fit snugly against the tube-sheet.

I do not confine the use of my invention to the tubes of steam-boilers exclusively, as the same may be applied to the tubes of superheaters and wherever it can be advantageously used; nor do I confine its use to one end of the boilers or superheaters, as it will be applied to both ends of each tube in some cases. The ends of the flue-tubes which are secured to the boiler-sheets or heads, and especially those ends nearest the fire, are exposed to intense heat, and the joints are very rapidly weakened and caused to leak; but by the application to these exposed points of flanged thimbles, constructed as I have described, the fire cannot impinge upon the ends of the tubes at the joints, as they are completely covered and protected by an additional thickness of metal, which can be readily removed and renewed when worn out.

The distinguishing characteristic of my invention is this: I construct each tube with a short auxiliary flanged tube at one or both ends at the time that I insert the tubes in the flue sheet or sheets. These short tubes are made of durable metal or fire-proof material. They are disconnectible from the tubes proper in the event of burning out. This is effected without disturbing the tubes proper. These auxiliary tubes save the tubes proper from burning out so as to require repairing. These auxiliary tubes, by being exposed to the heat or fire direct, expand to a greater extent than the tubes proper, and therefore leaks at the joints will not be experienced. These auxiliary tubes, when at each end of the tubes proper, increase the intensity of the circulating heat, as the current is slightly retarded between the ends of the auxiliary tubes. This, however, does not decrease the draft, as the sudden escape of the retarded current causes an increased draft at the aft end of the boiler.

My invention has no reference to repairing tubes, of boilers after their ends have been burnt out or caused to spring. It relates exclusively to the original or first insertion of

the tubes, and is designed to render the use of repairing contrivances unnecessary. It is true, I substitute a new auxiliary tube for a worn, out one; but in that case my boiler-tubes proper remain in their perfect condition unless destroyed by other causes than the intense heat to which the tubes without my removable auxiliary sections are exposed.

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

A device for protecting the ends of flues of steam-boilers superheaters, &c., constructed of a split tube, *a*, and a grooved face-flange, *c*, substantially as and for the purposes herein described.

SAMUEL WETHERED.

Witnesses:
N. G. PENNIMAN,
SAML. D. TOY.