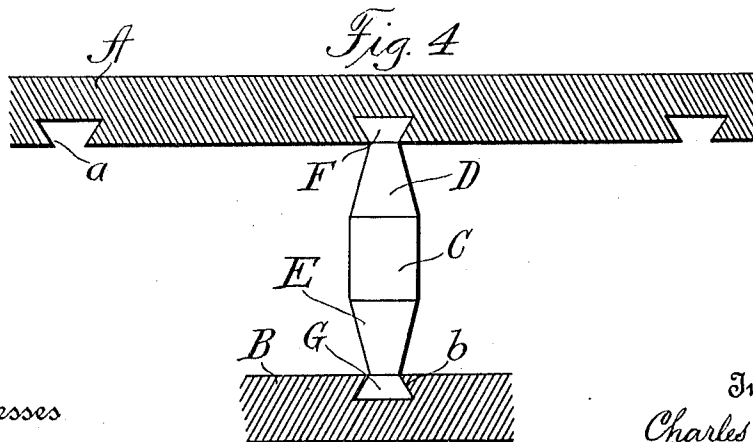
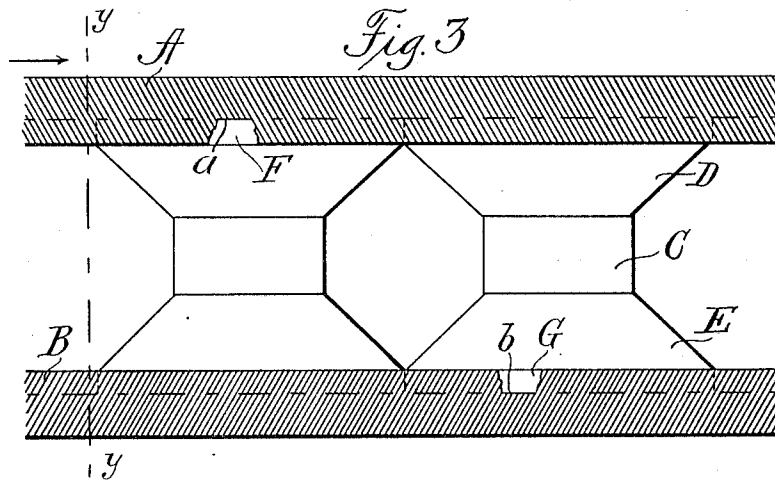
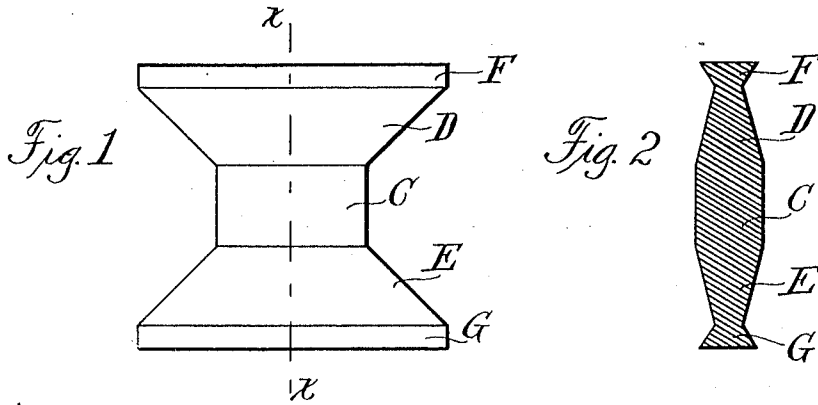


C. & C. E. WARD.
STAY FOR BOILER PLATES.

APPLICATION FILED MAR. 5, 1910. RENEWED DEC. 27, 1911.

1,020,235.

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Witnesses
Homer R. George
Edwin Guthrie.

Inventors
Charles Ward,
Charles E. Ward,
By Charles F. Benjamin,
Attorney

UNITED STATES PATENT OFFICE.

CHARLES WARD AND CHARLES E. WARD, OF CHARLESTON, WEST VIRGINIA.

STAY FOR BOILER-PLATES.

1,020,235.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, CHARLES WARD and CHARLES E. WARD, citizens of the United States, residing at Charleston, in the county of Kanawha and State of West Virginia, have invented certain new and useful Improvements in Stays for Boiler-Plates, of which the following is a specification.

This invention relates to stays for boiler plates, and has for its object the production of a stay adapted to sustain opposed plates, for example, in the headers or furnace walls of a steam boiler, against change of form or position from internal or collapsing pressures, the stays being applied to the plates interiorly without perforating the plates.

Where the customary staybolts are employed, the plates must be provided with holes for the passage of the ends of the bolts, and each hole becomes a probable point of leakage during the life of the boiler. It is believed that by the use of this invention the plates are stayed as strongly as they could be by the ordinary staybolts, that any effect of expansion or contraction by heat and cooling, or other movements of the parts may take place as freely as when staybolts are used, and the possibility of leakage through the plates is entirely eliminated.

The construction and arrangement of this invention are set forth in the accompanying drawings, of which—

Figure 1 represents a side view of one stay detached. Fig. 2 is a sectional view on line $x-x$ of Fig. 1. Fig. 3 illustrates two plates in section joined by stays made in accordance with this invention and placed in the same groove. The arrangement of the stays with respect to each other to permit the circulation of the water is shown in Fig. 3. Fig. 4 shows two plates, for example, in section on line $y-y$ of Fig. 3, and held together by a stay made in accordance with this invention. In Fig. 4 an endwise view of the stay is set forth, and the form of the retaining grooves in the plates together with the shape of the edge portions of the stay fashioned to engage the grooves are illustrated.

The same letter is used to refer to the same part throughout the description and drawings.

Considering the drawings, two plates A and B, are provided with dovetail grooves

a and b extending either vertically or horizontally.

Engaging the grooves are a number of stays, each comprising a middle or body portion C, which is the thickest, but narrowest portion. From the middle C, extending both ways are wedge-shaped portions D and E, which increase in width and decrease in thickness as they leave the middle portion C. At their outer, and, as stated, their wider and thinner parts, the wedge-shaped portions D and E terminate in dovetail edge portions F and G, best shown in Fig. 4, that engage the grooves in the plates. The object in decreasing the thickness and increasing the width of the stays as described, is to provide about the same amount and strength of metal at any part, and to avoid the use of more metal than is essential at any point.

By employing a considerable number of stays constructed as explained above, ample flexibility is attained, and the parts are readily made and easily assembled. The arrangement of the stays with respect to each other is best shown in Fig. 3, the stays being placed end to end in the same groove, leaving a considerable opening between them for the circulation of the water.

Having now described this invention, and explained the mode of its operation, what we claim is:—

1. A stay for boiler plates, comprising the combination with opposed plates provided with retaining grooves, of a plurality of separately removable stays arranged one after another in the same grooves and having portions constructed to engage the grooves of the plates, and the said stays having portions constructed to permit the water to pass through from one side of a row of stays to the other side thereof.

2. A stay for boiler plates, comprising the combination with opposed plates provided with retaining grooves, of a plurality of separately removable stays arranged consecutively in the same groove and having portions fashioned to engage the grooves of the plates, the said stays being constructed and arranged with respect to each other whereby open spaces remain between adjacent stays through which the water may circulate.

3. A stay for boiler plates, comprising the combination with opposed plates provided with retaining grooves, of a plurality of

separately removable stays arranged consecutively in the same groove and having portions constructed to engage the grooves of the plates, each of said stays having a
5 middle and relatively narrowest portion and diverging portions extending from the middle, the outer edge portions of said diverging portions being fashioned to engage the grooves of the plates.

10 4. A stay for boiler plates, comprising the combination with opposed plates provided with retaining grooves, of a plurality of stays arranged consecutively in the same grooves and having portions fashioned to

engage the grooves, and any two stays next 15 to each other in the same grooves having portions between said plates separated from each other whereby open spaces remain between the stays through which the water
may circulate. 20

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES WARD.
CHARLES E. WARD.

Witnesses:

THOS. LIVERSEDGE,
J. E. DAVIES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
