H. S. BRYAN.

Crown-Sheet for Fire-Boxes.

No. 198,342. Patented Dec. 18, 1877.

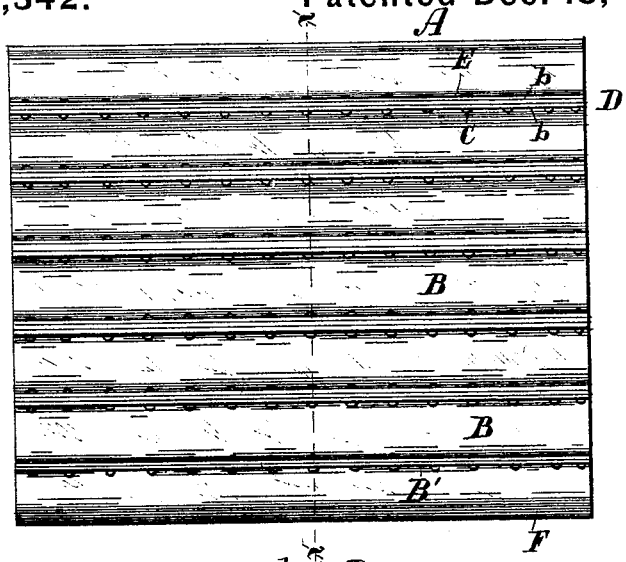

Fig 1

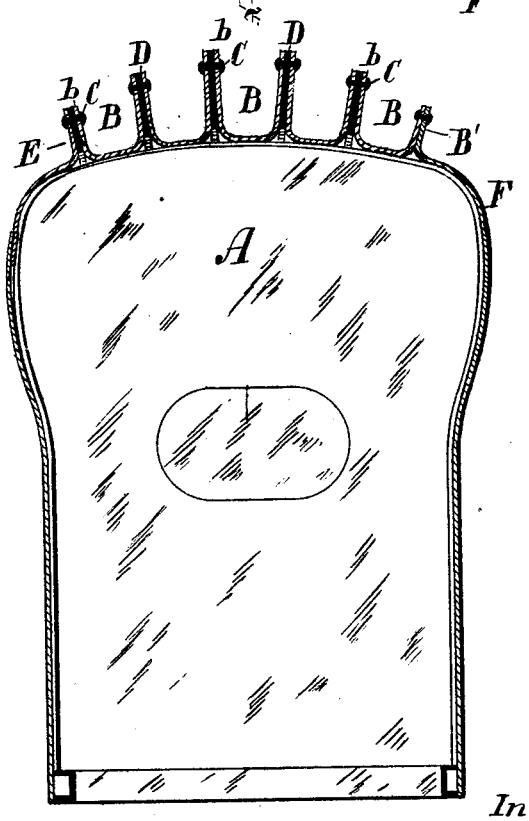

Fig 2

Witnesses

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HENRY S. BRYAN, OF AURORA, ILLINOIS.

IMPROVEMENT IN CROWN-SHEETS FOR FIRE-BOXES.

Specification forming part of Letters Patent No. **198,342**, dated December 18, 1877; application filed November 27, 1877.

To all whom it may concern:

Be it known that I, HENRY S. BRYAN, of Aurora, in the county of Kane and State of Illinois, have invented a new and useful Improvement in Crown-Sheet for Fire-Boxes, which is fully described in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a plan view of a fire-box with my improved crown-sheet; and Fig. 2 a transverse section of the same, taken on the line *x x*, Fig. 1.

The object of my invention is to dispense with the crown-sheet bars used in the ordinary construction of fire-boxes, thereby securing an improved circulation over the crown-sheet, and at the same time to secure a crown-sheet sufficiently strong to obviate the danger of collapse.

The invention consists in constructing the crown-sheet in sections, substantially **U**-shaped, the sections being riveted together along their upright portions, either with or without an intervening strip.

It also consists in making the sections with their flanges projecting highest at the central portion of the crown-sheet, their height diminishing in regular gradation each way therefrom.

It also consists in the peculiar construction of the sides of the fire-box, whereby it is carried up over the top of the box, and is provided with a flange, which is riveted to the first section adjoining.

In the drawings, A represents the main portion of a fire-box of any ordinary construction, adapted for use in any location desired, the main construction of the fire-box forming no part of my invention.

The crown-sheet of the fire-box, instead of being made in one continuous piece, is formed of several separate and independent sections, B. These sections are made separately from the plate usually employed, and are bent by any suitable means into the form shown in the drawings, which is substantially **U**-shaped, though the bottom or curved portion is flattened somewhat, so that a portion thereof will be nearly straight. This description of the particular shape of the sections refers, of course, to the cross-section of the sections.

The crown-sheet is formed by arranging the sections B side by side upon the top of the fire-box, bottom down, and then riveting them together by passing rivets C through the upright flanges *b* of the sections, these flanges standing alongside each other in pairs under the arrangement above described, as shown in the drawings. The ends of the sections are, of course, secured to the fire-box in the usual manner.

I prefer to employ, also, strips of plate D, which are inserted between the flanges *b* where they come together, as shown in Fig. 2 of the drawings, and riveting the flanges and strips together, as described above. These strips strengthen the structure, and facilitate the calking of the seams between the sections on the inside of the crown-sheets.

In Fig. 2 of the drawings the first right-hand seam, marked B′, is represented as formed by riveting the projecting flanges directly together without the interposed strip; but all the other projections are represented with the strip interposed. The sections are constructed, as to the width of their sides or flanges, in such manner that, when placed in position to form the crown-sheets, the central projections or ribs will be highest, as shown in Fig. 2 of the drawings, and on each side thereof their height is diminished regularly, each succeeding one being lower than the one immediately preceding it.

I make the middle rib or projection, or the two middle ones, about eight inches in height, the next on each side about six inches, and so on, diminishing the height two inches upon each succeeding projection. This arrangement gives the greatest strength to the sheet where it is required—along the central portion thereof—and it also permits the sections to be riveted together, as heretofore described, which would be impossible if the ribs were of the same height, unless the sections were so wide at the bottom as to afford the necessary room, which construction would materially weaken the crown-sheet.

The last section, E, is made with but a single flange along one edge, as shown in Fig. 2 of the drawings. The other edge is bent down and fastened to the side of the fire-box, in the ordinary way. Instead of this construction

however, the side of the fire-box may be extended up over the top a slight distance, as shown at F in the drawings, and the extreme upper edge bent upward and riveted to the first section. This latter construction is preferable in some instances, as thereby the seam at the side of the fire-box is avoided, and, in making new fire-boxes, is the one most desirable; but in putting this improved crown-sheet into old fire-boxes the construction with separate section E and seams must necessarily be employed.

In the drawings, the sections composing the crown-sheet are shown arranged lengthwise of the fire-box. It is evident, however, that the improvement is not limited to this arrangement, as the sections can be arranged transversely of the box, if desired, although I prefer the lateral arrangement shown, as it facilitates the construction with ribs or projections of different heights, as heretofore described.

From the above description it will be seen that there is a free open space between the ribs or projections, which permits a much better circulation than in the old construction with bars, can be easily cleaned, and at the same time is very strong.

All bolts and nuts projecting into the fire-box are also dispensed with, thereby avoiding a serious objection to the old style of crown-sheets with bars, as the projecting portions were exposed to very great heat, and were thereby soon weakened.

I am aware that crown-sheets have been made from a single continuous corrugated plate; but this construction is objectionable, for the reason that the sheet does not possess the necessary strength to resist the great pressure which is brought to bear upon it. By making the sheet of separate sections, riveted together, as described, however, sufficient strength is obtained for the crown-sheet, and all the advantages of free circulation incident to the employment of corrugated sheets.

The number of sections to be employed will, of course, vary with circumstances, and my invention is not limited to any particular number, the only rule being that they should be sufficient to afford as many ribs or projections as will give the crown-sheet its required strength for any particular location.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A crown-sheet for fire-boxes composed of independent sections, substantially U-shaped in cross-section, arranged side by side and riveted together in pairs, substantially as described.

2. The independent sections B, substantially U-shaped in cross-section, in combination with the intervening strips D, arranged between the flanges of adjoining sections, and riveted thereto, and arranged to form the crown-sheet of the boiler, substantially as and for the purpose set forth.

3. The crown-sheet composed of sections shaped as described, and having their flanges of different heights, whereby the ribs or projections of the finished crown-sheet are of greatest height along the central portion thereof, and decrease in height each way therefrom, substantially as and for the purpose set forth.

4. The U-shaped sections B, in combination with the connecting-strips E, shaped as described, whereby the sides of the fire-box are joined to the sections forming the crown-sheet, substantially as described.

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