No. 701,777. Patented June 3, 1902.

S. M. VAUCLAIN.

SEAM OR JOINT FOR STEAM BOILERS.

(Application filed Jan. 2, 1902.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

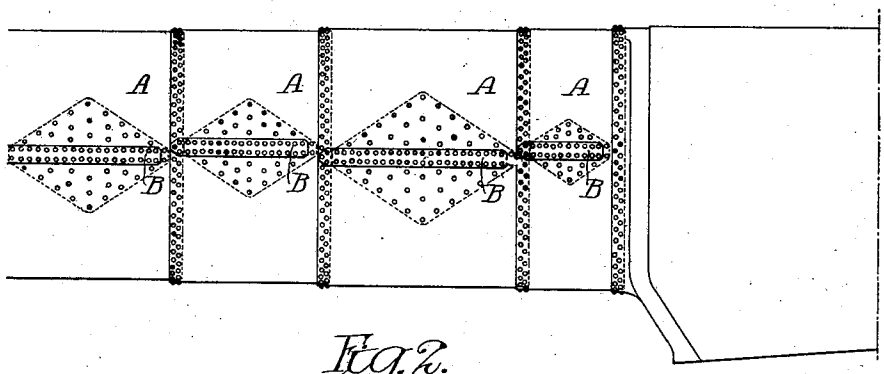


Fig. 2.

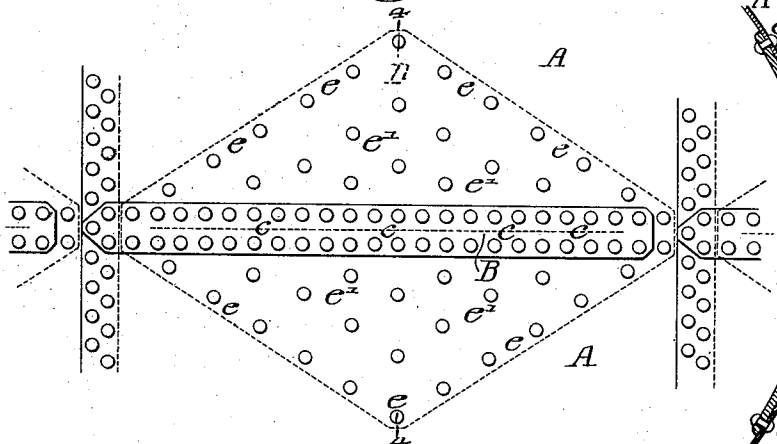


Fig. 4.

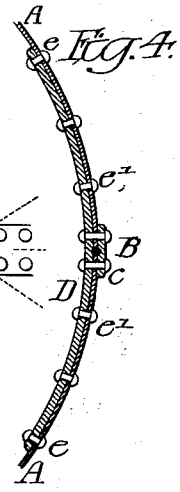
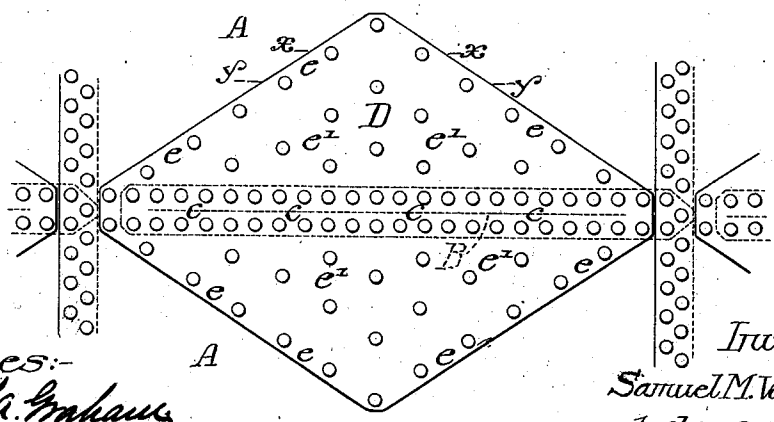


Fig. 3.



Witnesses:-
Frank La. Graham
Herman E. Metius.

Inventor:-
Samuel M. Vauclain,
by his Attorneys:
Howson & Howson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 701,777. Patented June 3, 1902.

S. M. VAUCLAIN.

SEAM OR JOINT FOR STEAM BOILERS.

(Application filed Jan. 2, 1902.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 7.

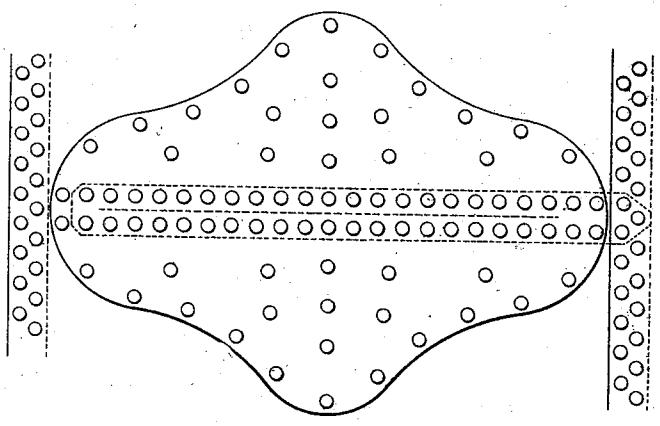


Fig. 5.

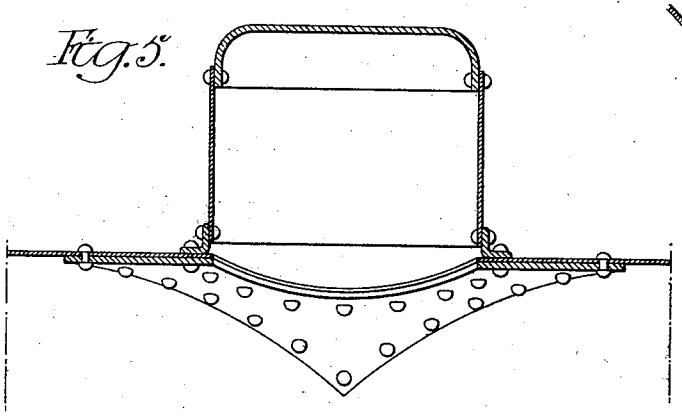


Fig. 8.

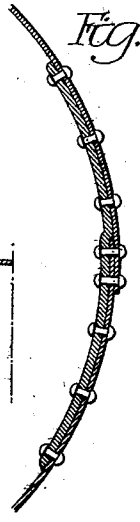
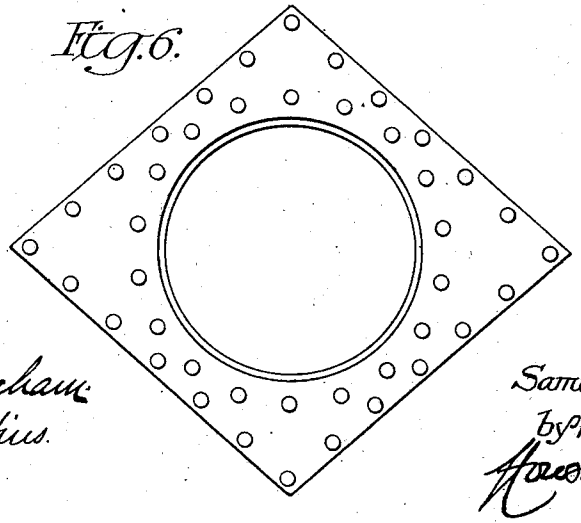


Fig. 6.



Witnesses:-
Frank L. A. Graham.
Herman E. Metius.

Inventor:-
Samuel M. Vauclain,
by his Attorneys:
Howson & Howson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

SAMUEL M. VAUCLAIN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO BURNHAM, WILLIAMS & COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A FIRM.

SEAM OR JOINT FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 701,777, dated June 3, 1902.

Application filed January 2, 1902. Serial No. 88,195. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL M. VAUCLAIN, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Seams or Joints for Steam-Boilers, &c., of which the following is a specification.

My invention relates to certain improvements in the seams or joints of plates under tension, and it is especially applicable to the seams of boilers or other containers.

The object of my invention is to materially strengthen the seam or joint. This object I attain in the following manner, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of a portion of a locomotive-boiler, illustrating my invention. Fig. 2 is a side view of one of the seams, showing the outside joint-strip in full lines. Fig. 3 is a rear view of the seam, showing the inside cover-plate in full lines. Fig. 4 is a section on the line 4 4, Fig. 2. Figs. 5 and 6 are views showing my invention applied to the dome-joint of a locomotive-boiler. Fig. 7 is a view of a modification, and Fig. 8 is a view showing my invention applied to a lap-joint seam.

A A are the two abutting plates of a locomotive-boiler. These plates make a butt-joint, as shown in Fig. 4.

B is the outside cover-strip, and D is the inside covering-plate.

The usual method of forming a butt-joint seam for locomotive-boilers is to simply abut the two plates and then place a narrow strip on the outside, covering the joint, and a second strip somewhat wider than the first strip upon the inside. Four or six rows of rivets are used, two or four rows passing through three thicknesses of plates and one row on each side passing through two thicknesses—that is, the inner strengthening-plate and the plate of the boiler. The strength of a seam having four rows of rivets is about eighty per cent. of the boiler-plate, and the strength of a seam having six rows of rivets is about eighty-six per cent., and the weakest point of the plate is generally on a direct longitudinal line through the outer row of rivets, uniting the inner strengthening-plate to the boiler-plate.

Up to the present time the forms of butt-joint seams for boilers mentioned above have been the standard in many locomotive-works. By my invention, however, I am enabled to materially increase the strength of this joint, making the joint practically as strong as the plate.

The two plates A A form a butt-joint, as shown in the drawings, and the outside cover-strip B is the same width as heretofore, having a single row of rivet-holes on each side of the center in the present instance; but the inside cover-plate B is preferably in the form of a diamond, as shown, being much wider on the center line 4 4 than at the ends. This increased width at the center enables me to provide a line of rivet-holes *e* near the edge of the plate D, as shown, so that the combined distance between the holes will be as great, if not greater, than the width of the plates to be joined, and the rivets are not on longitudinal lines of the boiler. Consequently the weakest part of the plate will not be on the outer line of rivets.

In Figs. 2, 3, and 4 the two lines of rivets *c c* near the abutting edges of the plates A pass through the inside cover-plate D, one of the boiler-plates A, and the outside cover-strip B, while the rivets *e* pass through holes on the inside cover-plate D and through holes in the boiler-plate on the diagonal lines shown. The additional rivets *e'* are preferably staggered within the diamond, as indicated in the drawings, and are for the purpose of securing the body of the plate D to the boiler-plates A.

The number of rivets *e'* is immaterial, the rivets preferably being in such numbers as to properly unite the plate D to the boiler-plates, and these rivets are so arranged that the joint will be stronger than the boiler-plate itself on any line taken through the side rivets, with the exception of the rivet at the extreme end of the diamond, the boiler-plate at this point being as strong as any portion of the plate, less the diameter of the hole through which the single rivet passes. If, for example, a fracture-line *x*, Fig. 3, is drawn through the

second row of rivets, the plate would be as strong as the solid portions of the plate minus the two rivet-holes plus the shearing strength of the single rivet beyond the line *x*. If a fracture-line *y*, Fig. 3, is drawn, the strength of the plate would be minus the three rivet-holes plus the shearing strength of the three rivets beyond the line securing the inside cover-plate D to the boiler-plate A, and this is carried out throughout the entire width of the joint. Thus I am enabled to materially increase the percentage of strength of the joint, and the joint can be designed stronger than the plate at all points except at the point where the single rivet secures the outer end of the plate D to the boiler-plate.

This invention can be used in securing the steam-dome to the boiler-shell, as shown in Figs. 5 and 6.

Usually the inner strengthening-plate is secured to the boiler-shell by transverse and longitudinal rows of rivets; but by making the plate as shown in the drawings the rivets will be on diagonal lines and the joint will be similar to the joint illustrated above.

I need not necessarily make the inner joint-plate B in the form of a diamond with straight sides, as the sides may be curved, as shown in Fig. 7, without departing from my invention, and any form of outside strengthening-strip B may be used and the parts may be reversed, if desired, the strip B may be placed on the inside, and the strip D can be placed on the outside, and while my invention is especially applicable to boilers it will be understood that it can be used in connection with any container or in fastening one plate to another, and in some instances my improved joint may be used in connection with a lap-joint, as in Fig. 8, as well as a butt-joint; but it is especially applicable to butt-jointed boiler-plates.

In the description I have referred to rivets; but it will be understood that bolts or other fastenings may be used without departing from my invention.

I claim as my invention—

1. The combination of two plates to be joined together, with a cover-plate secured to the said plates by rivets arranged on lines diagonal to the line of fracture, substantially as described.

2. The combination of two plates to be joined together, with a cover-plate secured to the said plates by rivets arranged on lines diagonal to the line of fracture, the diagonal lines being such that the combined distance between the rivet-holes will be as great or greater than the width of the plates to be joined, substantially as described.

3. The combination of the two plates one abutting the other, a cover-plate, rivets securing the abutting plates to the cover-plate, said rivets being on lines diagonal to the line of fracture and forming a diamond, so that the combined distance between the rivets on each side of the joint will be greater than the width of the plate, substantially as described.

4. The combination of the two abutting plates, an outside cover-strip, an inside cover-plate in the form of a diamond with a row of rivets on each side of the joint, securing the cover plate and strip to the plates to be joined, and a diagonal row of rivets securing the inside cover-plate to the plates to be joined, substantially as described.

5. The combination of the two abutting plates, a cover-strip secured to each plate by a single row of rivets, a diamond-shaped plate also secured to the abutting plates by the said rivets, with a row of rivets securing the said plate to the abutting plates on diagonal lines, the center rivets being farther from the seam than the end rivets, so that the seam will be stronger than the plates secured together with the exception at the point where the center rivet passes through the plate, substantially as described.

6. The combination of the abutting plates A, A, the cover-strip B, the inside cover-strip D in the form of a diamond, a row of rivets *c* securing the outer cover-strip and the inner cover-strip to the abutting plates, a row of rivets *e* arranged on an angle to the joint and adjacent to the edge of the diamond-shaped plate, substantially as described.

7. The combination of the abutting plates A, A, the cover-strip B, the inside cover-strip D in the form of a diamond, a row of rivets *c* securing the outer cover-strip and the inner cover-strip to the abutting plates, a row of rivets *e* arranged on an angle to the joint and adjacent to the edge of the diamond-shaped plate, with a series of rivets within the diamond securing the body of the diamond-shaped plate to the plates to be joined, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL M. VAUCLAIN.

Witnesses:

WILLIAM DE KRAFFT,

CLARENCE G. DODSON.