(No Model.)

J. B. BRENNAN.

UNWELDED LOCK BRACE STRAP FOR BOILER HEADS.

No. 438,522. Patented Oct. 14, 1890.

Fig. I.

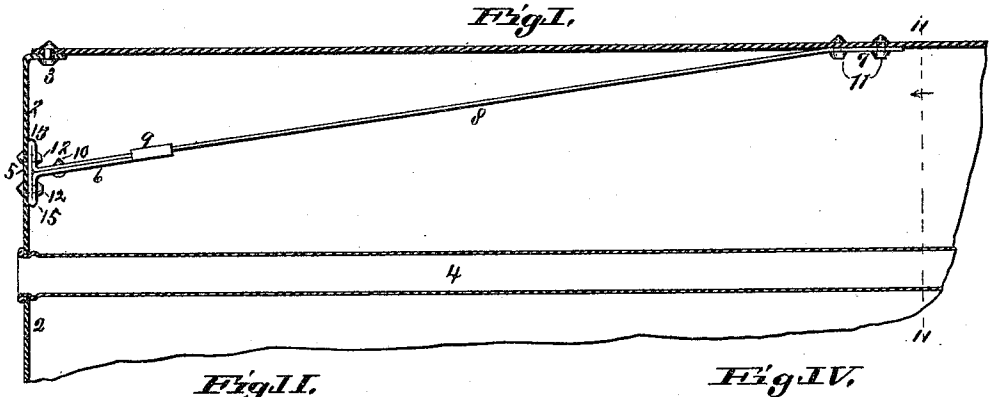


Fig. II.

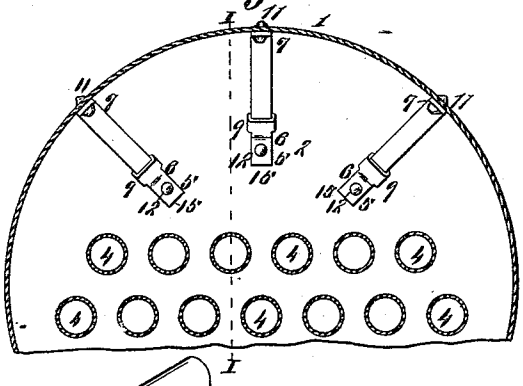


Fig. IV.

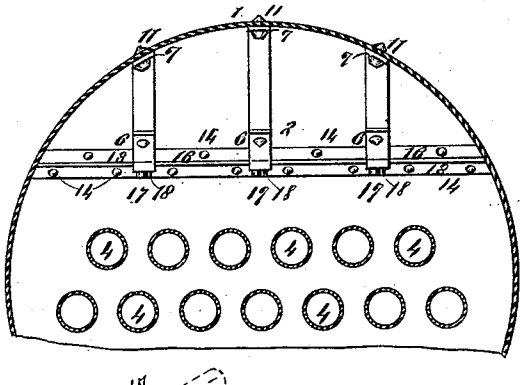


Fig. III.

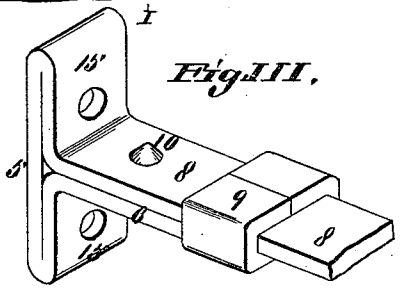


Fig. V.

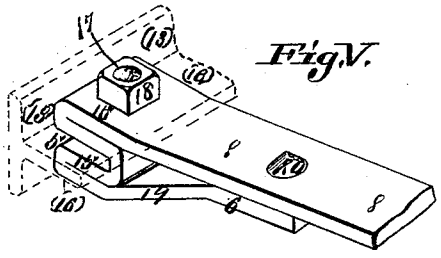
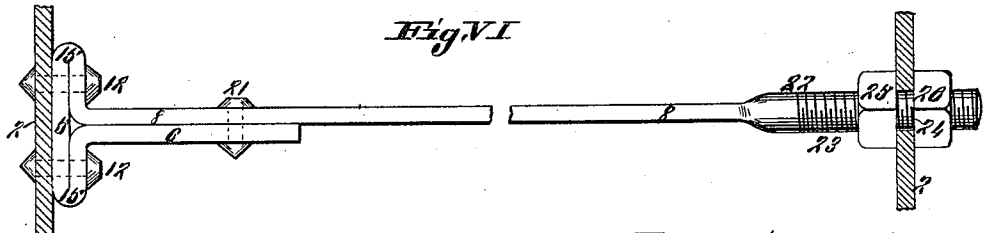


Fig. VI.



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UNITED STATES PATENT OFFICE.

JAMES B. BRENNAN, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO JOHN J. BRENNAN, OF SAME PLACE.

UNWELDED LOCK BRACE-STRAP FOR BOILER-HEADS.

SPECIFICATION forming part of Letters Patent No. 438,522, dated October 14, 1890.

Application filed August 11, 1890. Serial No. 361,677. (No model.)

To all whom it may concern:

Be it known that I, JAMES B. BRENNAN, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Unwelded Lock Brace-Straps for Boiler-Heads, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to a lock-brace, preferably constructed of sheet steel, without a weld, for a sustension hold against steam-pressure of the surmounting portion of boiler-heads above the flues; and the invention consists in features of novelty, hereinafter fully described, and pointed out in the claims.

Figure 1 is a vertical detail longitudinal section taken on line I I, Fig. II, and shows the respective positions of the lock-brace and of the head and cylinder of the boiler to which said brace is riveted above the space occupied by the flues. Fig. II is a vertical transverse section taken on line II II, Fig. I, and shows the radial position of the lock-braces when riveted to a plain boiler-head. Fig. III is an enlarged detail perspective of the unwelded locking-brace, and shows the form into which its angle-flanges are bent into return-folds for riveted attachment to the head. It also shows the locking-keeper that clamps the return extension of the brace-bar to the main bar, against which it lies parallel. Fig. IV is a vertical section of a modification in which the boiler-head being re-enforced midway between the flues and its summit by a stretch of T-iron strap that reaches diametrically across it and which is riveted to said head, and with which a modification of the brace shown in Fig. V is used, which brace has bifurcated clamp-flanges that embrace the projecting limb of the aforesaid T-iron to which it is bolted. Fig. V is an enlarged detail perspective of a modification of the brace, the boiler-head end of which brace has bifurcated clamp-flanges that embrace and are riveted to the projecting limb of a T-iron strap that has a riveted attachment to the boiler-head; and Fig. VI is an enlarged detail longitudinal view of a modification of the brace that braces direct from head to head of the boiler, showing the two ends of said brace, the flanged head of the brace-rod being riveted to one head of the boiler and the reverse end being adjustably secured by screw-nuts.

Referring to the drawings, 1 represents the cylinder of the boiler, and 2 are its heads, which are secured to the cylinder by the rivets 3 in the usual manner. 4 are the flues, which, to the height in which they are located in the boiler, brace the heads. Now, above the location of said flues, when the heads have been braced, it has been customary to employ welded braces for the purpose, and sometimes when there happened to be an imperfect weld and the weld in consequence has given out it has led to disastrous accidents with the boiler. To obviate this difficulty and to avoid the danger of explosions incident thereto, I have invented a sheet-metal-strap brace, preferably of steel, but which may be of any other suitable metal. As the material of construction is sheet metal, I am enabled to and do fold it when heated to any required form to construct the twofold duplex flange-heads 5, the return-fold 6, the angle-foot 7, and the intermediate stem 8 integral in one piece without a weld. For this purpose I preferably use sheet-steel of half an inch in thickness and cut it in straps two and a half inches wide; but said thickness and width may be varied to the pressure to be withstood.

When the attachment is to a plain boiler-head, the preferable form of brace is that shown in Figs. I, II, and III. In this form the strap is bent when heated into the twofold duplex flange T-head 5, which, with the stem, forms a T. The parallel return-fold 6 from said head folds snugly against the main stem 8 above and is locked in close fold thereto by the locking-keeper 9, that embraces said stem and return-fold and locks them firmly together, and the folds of the main stem 8 and said return-fold 6 are still further secured together by the rivet 10.

The stems of the braces are bent at the equivalent incline required for their angle-foot terminals to come in contact with the cylinder of the boiler, while the attachment

of their flanged heads approximates to a position about half-way between the top tier of flues and the periphery of the boiler-head. Said angle-foot terminals, where they come in contact with the cylinder of the boiler, are bent in line with said cylinder, so that they can be firmly secured thereto by the rivets 11, the duplex turned flange-heads 5 at the other end of the brace being secured to the head of the boiler approximately to half-way between the upper tier of flues and the dome-arch of said boiler by the rivets 12.

As there is no weld in the construction, there can be no faulty weld, neither can there be, as there frequently is, in welding the brash breakage of the metal fiber or the turning it at cross-angles in adverse positions to withstand heavy strains, whereas on the other hand the sheet metal of which my braces are constructed is rolled to a finish, so that the metal fiber of a necessity must lay longitudinally of said brace, as its attitude is not changed in construction after said rolling process, so that it is quite clear of brash cross-laying fiber.

In Fig. V is shown a modification of the brace, which modified form principally relates to a diversion in the construction of the flanged head to adapt it for attachment to T or angle iron when angle or T-strap iron 13 is secured inside the boiler-head by rivets 14, as shown in Fig. IV, the inner projecting stem of which makes a convenient means for the attachment of the flanged brace-head, as shown in said modification in Fig. V. In said modification the two double-fold arms of the flanged head, which are alike numbered 15 with like parts of the T-head, instead of being bent outward at an angle from the stem, so as to make a T-head to said stem, as shown in Figs. I, II, and III, said two double-fold flanges are located in parallel lines, which are respectively only a sufficient distance apart to seat between them the projecting stem 16 of the T-iron strap 13, that is riveted to the inside of the head of the boiler. The attachment flanges in this modification, in conjunction with the coupling portion, as shown in Fig. V, are formed into the shape of a letter U, making a flanged U-head, which, having substantially the same functions as the flanged T-head, is alike numbered 5, the flanges of which U-head embrace said projecting stem 16 of the T-iron strap on the boiler-head, to which projecting stem they are secured by the screw-bolts 17 and screw-nuts 18. While I prefer said screw-bolt attachment as easy of attachment and detachment, yet I do not confine myself to the same, as rivets may supply the place of the screw-bolts. The return-strap 6 in this modification, as unlike with the T-head, it starts from the head at a point further apart from the main stem. It therefore angles upward on the incline 19 until it reaches the main stem, with which it then runs on a parallel line alike numbered 6 with the like parallel return-straps in the other figures. A rivet 20 rigidly holds said parallel straps together.

In Fig. VI is shown another modification of the brace-strap, which, however, has the same form of T-head as in Figs I, II, and III, and alike riveted to the boiler-head; but as in this modification the brace reaches from head to head the stem 8 runs the length of the boiler at a right angle to the flanges of the T-head. The return-fold 6 of the strap, as in the first three figures, runs back parallel with the main stem 8, to which it is secured by the rivet 21. The rear end of the stem of the brace in the said modification for bracing head to head of the boiler is swaged or otherwise worked from its strap shape into a round form 22, on which a screw-thread 23 is formed. Thus prepared, the two and a half by half inch strap is transferred into a one and a fourth-inch round rod without any objectionable welding process. The said screw-threaded terminal rod of the strap passes through and is seated in a perforation 24 in the rear head of the boiler of a corresponding size, and an inner screw-nut 25 and outer screw-nut 26, that in their respective positions are seated on the screw-rod terminal of the brace, are screwed up so as to be adjusted and to firmly clamp against the rear boiler-head inside and out, the T-head having been previously riveted, as described in the form shown in Figs. I, II, and III, to the front boiler-head.

Now, it will be seen that both in the form of the brace shown in the first three figures and in the two slightly-modified forms shown in the other figures the leading features of the invention are alike found, among the most important of which is that it is free from any welded joint, which is always an uncertain point of possible and sometimes probable danger, and it is constructed from a material rolled to a finish, the fiber of which is nowhere transversely cut except at the ends, and the locking-keeper 9 holds the return-fold 6 in tight and strong contact with the main stem, thus guarding against the initial danger under a heavy adverse stress of the springing down of the end of said return-fold and the consequent bursting of the rivets and contortion of the T-head.

I have shown and described the brace as made from half-inch steel plate in straps of two and a half inches in diameter; but I do not confine myself to that size strap, for it is evident that for the sustension of the heads of extremely large boilers under high pressure the weight of the brace may be advantageously increased, and with small boilers worked under low pressure it may be decreased without any departure from the essential features of the invention, as described above.

In common-sized and usual construction of boilers the braces are preferably from four to

six feet long; but it is evident that the length may be advantageously varied in accordance with the size and form of the boilers without departing from the essential features of the invention.

The locking-keeper shown on the brace in Figs. I, II, and III may also be beneficially used on either of the other two braces when desired, and it is also very obvious that the duplex head 15 (shown in Fig. V) may be substituted for the plain head used in the form shown in Fig. VI.

I claim as my invention—

1. An unwelded strap-brace for boiler-heads having one end secured to the boiler and having at its other end a double-fold perforate flanged head riveted to said boiler-head, substantially as and for the purpose set forth.

2. In a brace for boiler-heads, the combination of the folded and formed brace-strap constructed without welding from sheet metal adapted to be secured at one end to the boiler and having a double-fold flanged perforate head arranged to be riveted to the boiler-head at its other end, substantially as and for the purpose set forth.

3. In a brace for boiler-heads, the combination of the stem 8 of the folded and flanged brace-strap adapted to be secured at one end to the boiler, said brace-strap constructed without welding from sheet metal, the double-fold duplex head-flanges 15, provided with perforations, the rivets 12, seated in said perforations and that secure said duplex-flanged head to the boiler-head, the return-fold 6, and the locking-keeper 9, that embraces said return-fold in close contact with said stem 8, substantially as and for the purpose set forth.

4. In a brace for boiler-heads, the combination of the stem 8 of the folded and flanged brace-strap, adapted to be secured to the boiler at one end, said brace-strap constructed without welding from sheet metal, the double-fold duplex perforate head-flanges 15, riveted to the boiler-head, the return-fold 6, and the rivet that unites said return-fold to the main stem, substantially as and for the purpose set forth.

5. In a brace for boiler-heads, the combination of the main stem 8 of the double folded and flanged brace-strap, said brace-strap constructed without welding from sheet metal, the double-fold duplex perforate head-flanges 15, the rivets that secure said head-flanges to the boiler-head, the return-fold 6, the rivet that unites said return-fold to said main stem, the screw-threaded foot terminal 22, that is seated in the perforation 24 in the rear boiler-head, and the screw-nuts 25 and 26, that adjustably clamp said screw-threaded foot terminal to the rear boiler-head, substantially as and for the purpose set forth.

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In presence of—
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