

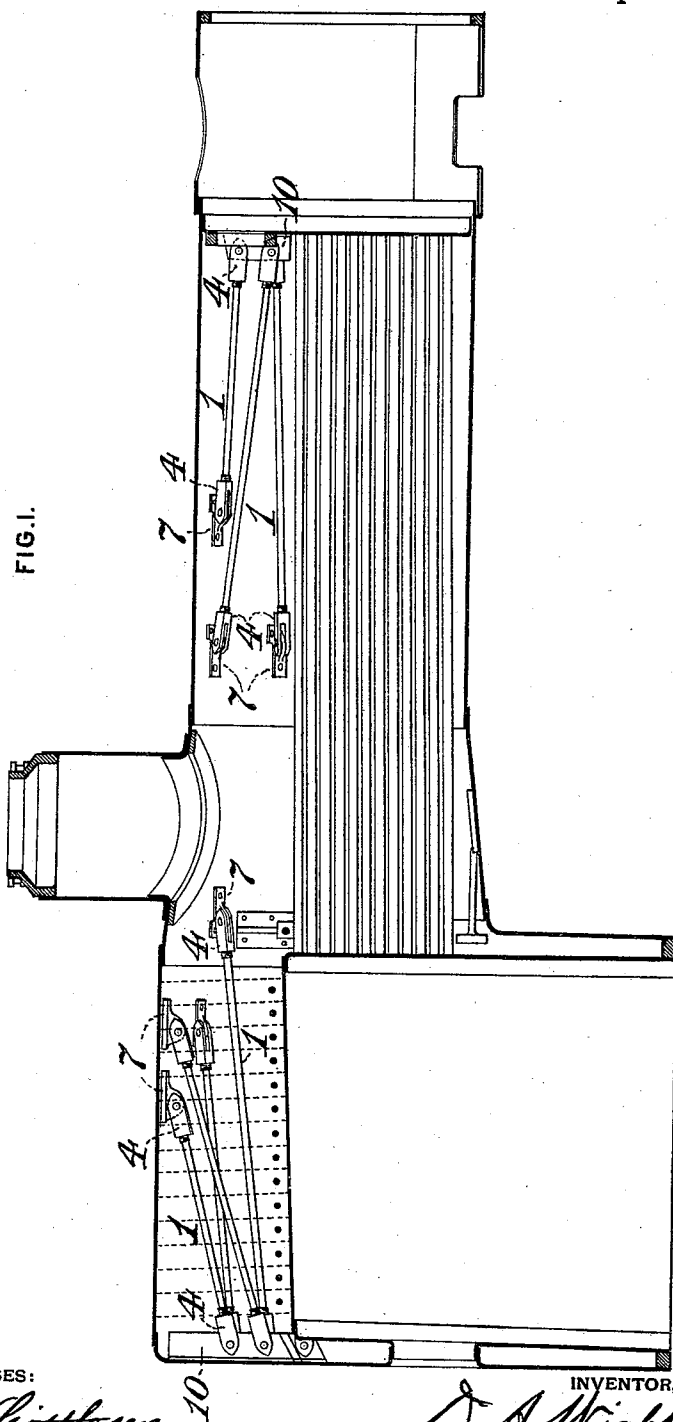
(No Model.)

2 Sheets—Sheet 1.

D. A. WIGHTMAN.
BOILER BRACE.

No. 473,183.

Patented Apr. 19, 1892.



WITNESSES:

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(No Model.)

2 Sheets—Sheet 2.

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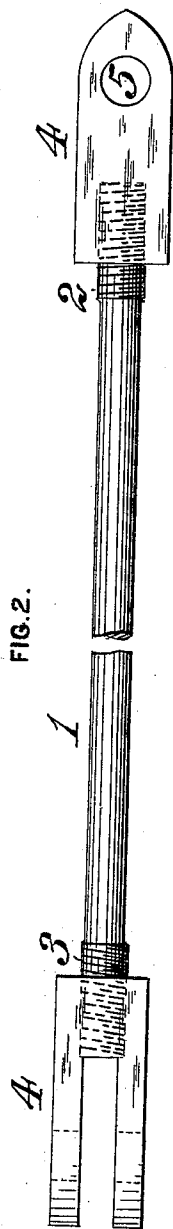


FIG. 2.

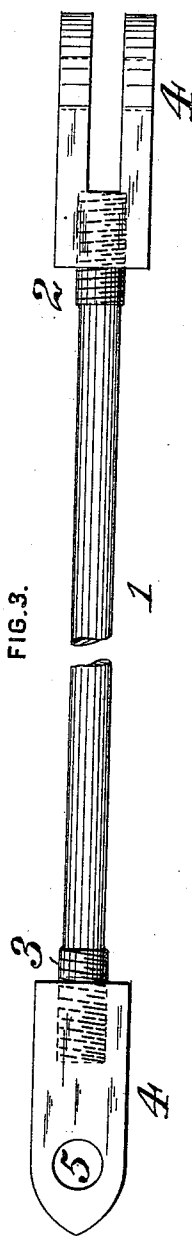


FIG. 3.

FIG. 6.

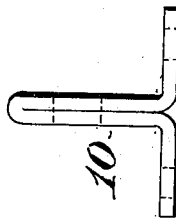


FIG. 7.

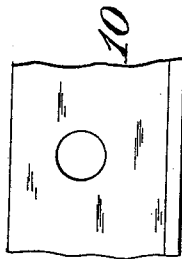


FIG. 8.

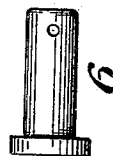


FIG. 4.

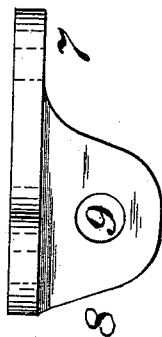
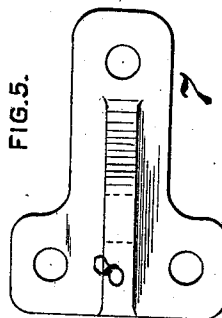


FIG. 5.



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UNITED STATES PATENT OFFICE.

DANIEL A. WIGHTMAN, OF ALLEGHENY, PENNSYLVANIA.

BOILER-BRACE.

SPECIFICATION forming part of Letters Patent No. 473,183, dated April 19, 1892.

Application filed December 16, 1891. Serial No. 415,266. (No model.)

To all whom it may concern:

Be it known that I, DANIEL A. WIGHTMAN, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Boiler-Braces, of which improvement the following is a specification.

The object of my invention is to provide a brace or stay for the flat or flattened surfaces of steam-boilers or other receptacles of fluid under pressure which shall embody the advantages of being weldless and machine-made throughout, capable of accurate adjustment for normal and uniform resistance to strain, and of materially-lower cost of production than braces of the ordinary type.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a vertical longitudinal central section through a locomotive-boiler, illustrating the application of my invention thereto; Figs. 2 and 3, views in elevation, upon a larger scale and taken at right angles one to the other, of a boiler-brace embodying my invention; Figs. 4 and 5, side and bottom views, respectively, of a bearing-piece for the connection of the brace to a curved portion of a boiler-shell; Fig. 6, an end view of a bearing-piece for the connection of the brace to a flat portion of a boiler-shell; Fig. 7, a partial side view of the same, and Fig. 8 a view in elevation of one of the coupling-pins which connect the brace and bearing-pieces.

In boiler-braces of the ordinary type known and used now and prior to my invention the heads are forged separately from the brace-rod and are afterward welded to its ends, one of them being set at such an angle to the rod as will admit, as nearly as practicable, of being fitted against and riveted to a curved portion of a boiler-shell at a desired location thereon. The opposite head of the brace is coupled by a pin or bolt to a T-iron or other suitable bearing or connecting-piece riveted to a flat end or head of the boiler. Braces of this character, while generally employed, are admittedly objectionable in the particulars of being comparatively expensive in the cost of blacksmiths' and boiler-makers' labor involved in making and adjusting them, of being welded, and thereby subject to liability

to dangerously weaken a boiler by breakage from a defective weld, and of being practically incapable of such adjustment and connection to the boiler that they shall exert normal and uniform draft on the surfaces which they are designed to stay. In applying the ordinary braces to a boiler they must be first put in, then marked off, punched, put back, and riveted in, and even with the exercise of ordinary care on the part of the boiler-maker it is frequently found that some braces are drafted unduly tight, while others may be so slack as to exert no draft whatever or to be even bent or buckled, so as to be actually compression instead of tension members.

My improvement has been found in practice to fully and satisfactorily obviate the objections above stated and is applicable to service without involving modification or change of other parts under any and all conditions to which the ordinary brace is adapted.

My invention is herein illustrated as applied in connection with a locomotive-boiler of the present standard type, and, while it is specially designed and adapted for constructions of such character, it will be obvious that it is equally adaptable to other forms of steam-boilers, as well as to reservoirs, tanks, or other structures in which it is necessary or desirable to provide bracing for flat surfaces against pressure exerted thereon.

In the practice of my invention the ends of a rod 1, of suitable diameter and length for the service required, are upset or increased in diameter, and screw-threads 2 3, which are preferably, as shown, of opposite lead—that is to say, right and left handed, respectively—are cut upon said ends. The heads 4 of the brace, which may be of similar form, are preferably made by drop-forging, and eyes 5 are formed in said heads to receive coupling bolts or pins 6. An internal screw-thread is cut upon each head at and near the end farthest from its eye 5, the threads of the two heads of each brace being in correspondence with those of the ends of the rod 1 which they are designed and adapted to engage. In the instance shown the heads 4 are bifurcated, an eye being formed in each of their jaws, which are adapted to embrace a projection upon a fixed bearing-piece; but, if preferred, they may have only a single tongue or plate adapt-

ed to fit between jaws on a bearing-piece. The bearing-pieces or ties by which the braces are connected to the boiler-shell and heads or ends may be of any suitable form adapted to be firmly secured to the boiler and to present a proper bearing for the reception of a connecting or coupling pin.

Figs. 4 and 5 show a bearing-piece suitable for attachment to curved portions of the shell, the same consisting of a foot 7, in which are formed a proper number of rivet-holes and which has a projecting lug 8, adapted to fit freely between the jaws of a brace-head 4 and provided with an eye 9 to receive a coupling-pin 6. Figs. 6 and 7 show a bearing-piece substantially of the form ordinarily used on the flat ends or heads of boilers, the same being a plate bent into T-section and provided with coupling-bolt eyes. If preferred, T-iron of proper strength may be substituted, the special form of these and of the shell bearing-pieces not forming any part of my present invention.

In practice the bearing-pieces or ties are riveted to the shell in their several desired positions by a riveting-machine while the shell is being put together, after which it is only necessary to put the braces in position, insert the coupling-pins, and draw the braces to their proper degree of tightness by turning the rods 1, and thereby screwing the heads 4 into their proper positions on the screw-threads of the rods.

It will be seen that my improved brace has no welds and may be made altogether by machinery. In its application absolute uniformity of tension of the several braces may be secured, a result of substantial practical importance and value which is impossible

with the ordinary brace, and I have found in actual use that the entire labor on my improved brace is less than either the blacksmith's or the boiler-maker's labor on the ordinary brace.

I claim as my invention and desire to secure by Letters Patent—

1. A weldless boiler-brace in which are combined a brace-rod having oppositely-leading screw-threads on its respective ends and two heads, each of which is threaded to engage one of the threads of said rod and provided with a jaw adapted to engage a fixed bearing-piece and having eyes to receive a coupling-pin for connection thereto, substantially as set forth.

2. The combination of a brace-rod having screw-threads on both its ends, two heads, each threaded to engage one of the threads of said rod and provided with a coupling-pin eye, two bearing-pieces or ties, each adapted to be secured to a boiler-sheet and provided with coupling-pin eyes, and coupling-pins passing through the eyes of the brace-rod heads and bearing-pieces, substantially as set forth.

3. The combination, with a steam-boiler, of a series of bearing-pieces or ties fixed to the heads or ends of the boiler, a series of bearing-pieces or ties fixed to the shell of the boiler, and a series of longitudinally-adjustable braces, each coupled at one end to a head or end bearing-piece and at the other to a shell bearing-piece, substantially as set forth.

DANIEL A. WIGHTMAN.

Witnesses:

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