

1,424,948.

3 SHEETS--SHEET 1.



Inventor

W. J. Stoop.

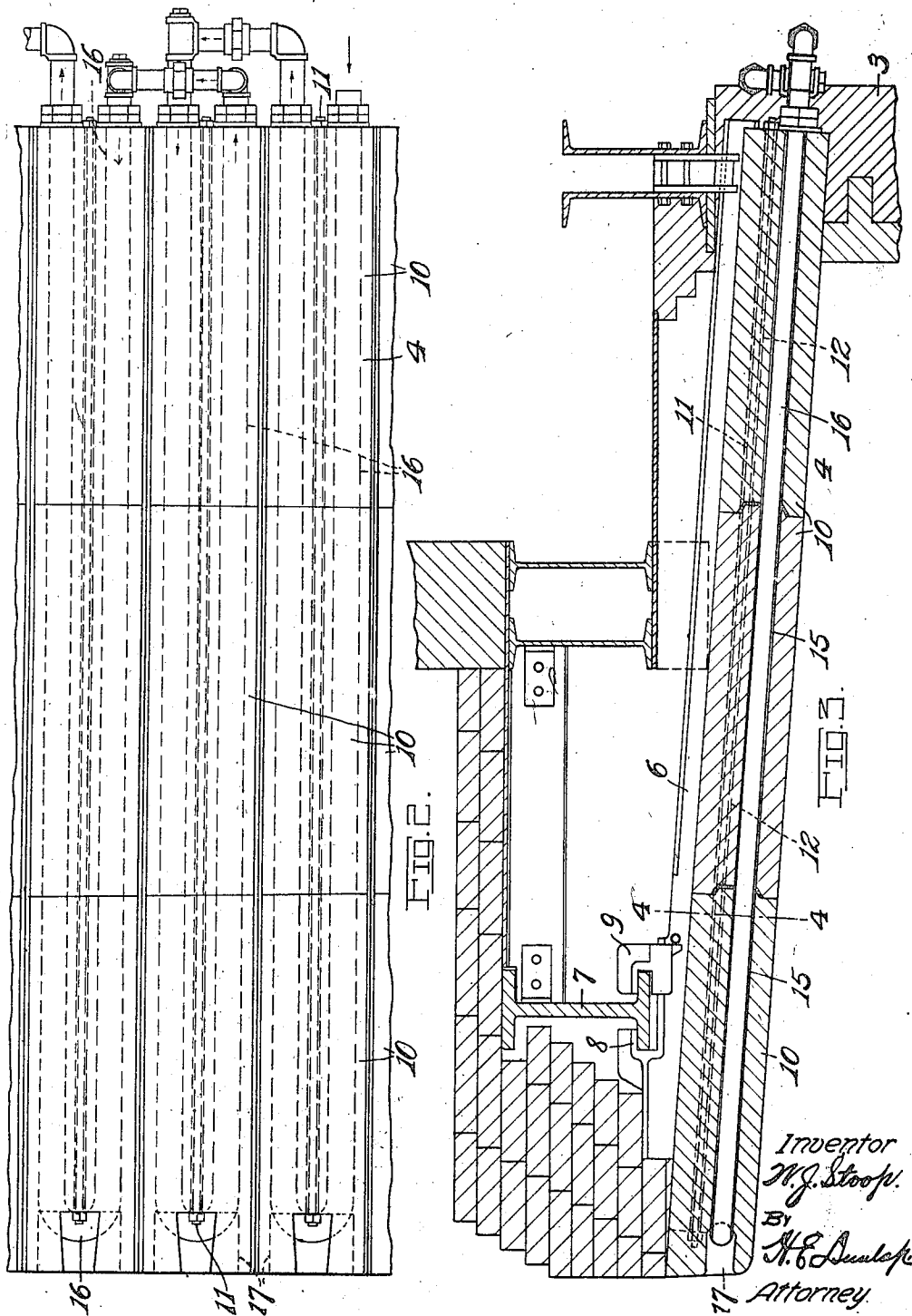
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W. J. STOOP.
 ARCH FOR THE FIRE BOXES OF BOILERS.
 APPLICATION FILED FEB. 17, 1921.

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Patented Aug. 8, 1922.

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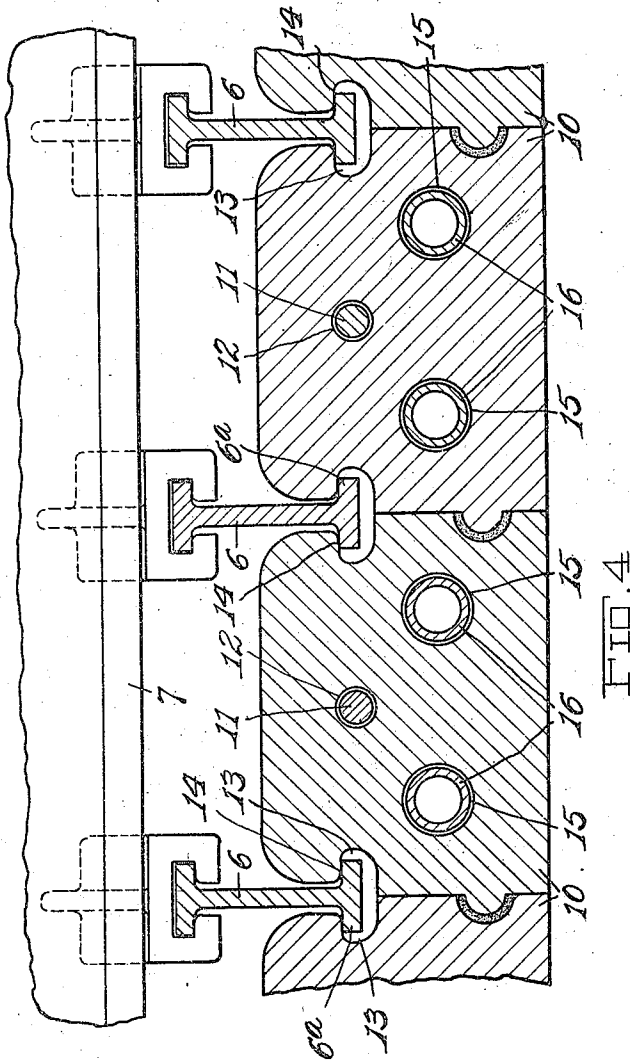


FIG. 4

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UNITED STATES PATENT OFFICE.

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ARCH FOR THE FIRE BOXES OF BOILERS.

1,424,948.

Specification of Letters Patent.

Patented Aug. 8, 1922.

Application filed February 17, 1921. Serial No. 445,664.

To all whom it may concern:

Be it known that I, WILLIAM J. STOOP, a citizen of the United States of America, and resident of Wheeling, county of Ohio, and State of West Virginia, have invented certain new and useful Improvements in Arches for the Fire Boxes of Boilers, of which the following is a specification.

This invention relates to arches for the fire-boxes of water tube boilers, and it has for its primary object to provide an arch of suspended type provided with water circulation means whereby it is maintained in a relatively cool condition, to the end that it will successfully withstand the high temperatures to which it is subjected and will, therefore, last for a relatively great length of time.

Further objects of the invention will hereinafter be made apparent, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal section of a fire-box and arch embodying my invention;

Figure 2 is an enlarged plan view of a fragmentary portion of the arch showing the water circulation pipes associated therewith;

Figure 3 is an enlarged longitudinal section of the arch and the arch-suspension means; and—

Figure 4 is an enlarged detail section on line 4—4, Fig. 3.

Referring to said drawings, 1 indicates the interior of the fire-box of a water tube boiler of a more or less common type, which may be fed in any appropriate manner, as by stoker when coal is the fuel employed, or by gas or oil, a gas burner 2 being herein shown for illustrative purposes as opening through the front wall 3 of the fire-box.

Supported by the front wall 3 is the rear end of an arch 4 which overhangs the fire-box, the same being of the type commonly termed flat and being slightly inclined in an upward direction and terminating adjacent to the boiler tubes 5. Said arch is suspended by a structure which, in all material respects, is substantially identical with that disclosed in my copending application, Serial No. 432,969, said structure including a plurality of relatively spaced parallel bars 6 and a transverse I-beam 7, the inner ends of said bars being attached to said I-beam by clamp-like hanger members 8 and 9.

The arch 4 is composed of a plurality of parallel courses of heavy blocks 10 of a suitable refractory material, each course being composed of a plurality of said blocks disposed in alined closely-fitted relation and secured against relative displacement by means of a tie-rod 11 directed longitudinally through alined holes 12 provided therefor in said blocks.

The main body portions of the blocks of the various courses have a width approximating the distance between the vertical center lines of adjacent bars 6, so that adjacent courses meet beneath said bars, as shown in Fig. 4, to form a continuous flat arch facing. Formed in the opposite lateral faces of each block adjacent to its upper surface is a longitudinal channel 13 in which is received the lower flanges 6^a of the adjacent bars 6, said flanges cooperating with downwardly facing shoulders 14 on said blocks for supporting the latter.

Extending lengthwise through the blocks of the various courses are two parallel holes 15 occupying the same horizontal plane, the holes of the various blocks of each course being in register. Fitted in the holes of each course are the parallel legs of a U-shaped pipe 16 designed for the passage of water whereby, through absorption of the heat, said blocks are maintained in a relatively cool condition. The outer ends of the pipes project from the outer end of the outermost blocks of the courses and adjacent pipes are coupled together to provide for a continuous circulation of water throughout the entire arch facing composed of said courses.

To prevent direct exposure of the inner, or leg-connecting, curved portion of the pipes 16 to the intense heat generated in the fire-box, the inner end of the innermost block of each course is provided with a recess 17 adapted for the reception of said curved portion, and this recess is closed with a suitable refractory filling 18 following the introduction of the pipe, as shown in Fig. 1.

To facilitate the coupling of the various pipes 16, adjacent pipes have alternate legs thereof coupled together, as is most clearly shown in Fig. 2, thus causing the flow of the water through adjacent courses to be in reverse directions, as indicated by arrows in said figure. This manner of coupling is employed to avoid the close couplings which would otherwise be necessary due to the

limited space between the legs of adjacent pipes.

The water coursing through the pipes in the arch facing cools the latter by absorbing heat therefrom. This water, with the heat so absorbed, may be utilized in the boiler, being suitably conducted thereto from the arch.

What is claimed is—

1. An arch for the fire boxes of boilers, comprising an arch facing composed of a plurality of parallel courses of longitudinally alined blocks of a suitable refractory material, each course having the blocks thereof provided with parallel longitudinally extending bores, a water pipe of substantially U-shape extending throughout said courses and having the opposite legs thereof received in said bores, said pipes having their outer ends coupled together in series to provide for circulation of water successively through the various courses, and means supporting said courses.

2. An arch for the fire-boxes of boilers, comprising an arch facing composed of a plurality of parallel courses of longitudinally alined blocks of a suitable refractory material, each course having the blocks thereof provided with parallel longitudinally extending bores, a water pipe of substantially U-shape extending throughout said courses and having the opposite legs thereof received in said bores, the curved leg

connecting portion of each pipe being embedded in the innermost blocks of the courses, said innermost blocks being recessed for the reception of said portion and having a refractory filling closing said recess, the outer ends of adjacent pipes being coupled together to provide for passage of water from one to another thereof successively throughout the entire series of courses, and means supporting said courses in place.

3. An arch for the fire-boxes of boilers, comprising an arch-facing composed of a plurality of parallel abutting courses of longitudinally alined blocks of refractory material, means suspending said courses over the fire-box, means whereby the blocks in each course are attached together, each course having a pair of parallel longitudinally extending bores therethrough, a water conducting pipe in the bores of each course, said pipe having parallel legs connected adjacent to, but short of, the inner end of the innermost block of the course, and having the outer ends of said legs projecting from the outer end of the outermost block of the course, and means coupling the pipes of said courses so that water may course through said courses in succession.

In testimony whereof, I affix my signature in presence of a subscribing witness.

WILLIAM J. STOOP.

Witness:

H. E. DUNLAP.