

C. A. BROWN.
 BOILER CONSTRUCTION AND MEANS FOR MAKING THE SAME.
 APPLICATION FILED AUG. 1, 1910.

1,008,628.

Patented Nov. 14, 1911.
 2 SHEETS-SHEET 1.

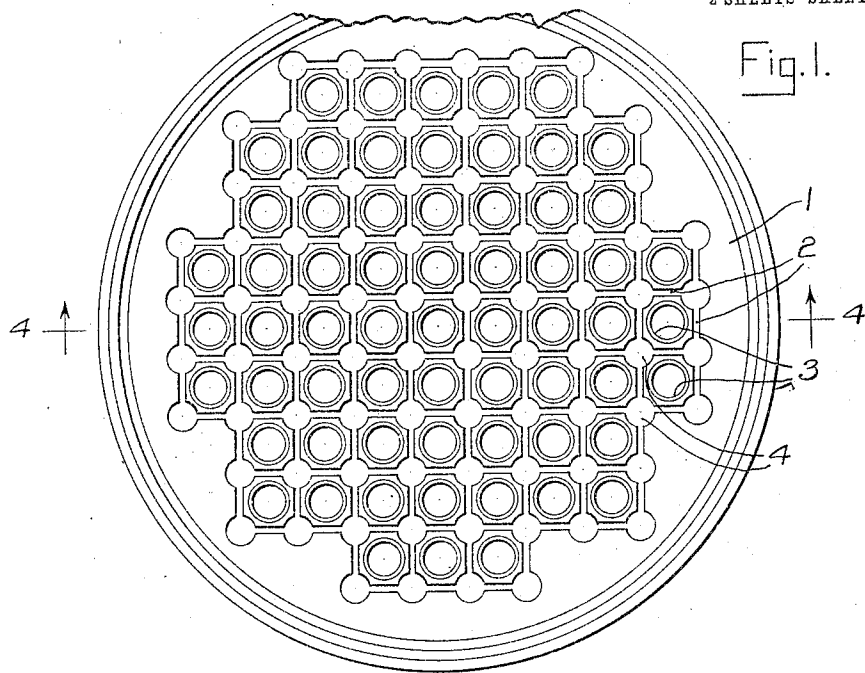


Fig. 2.

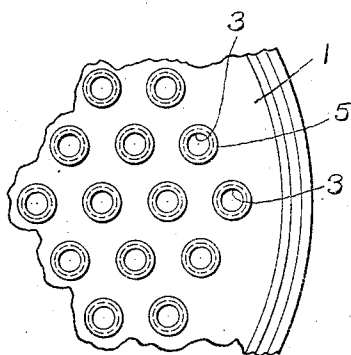
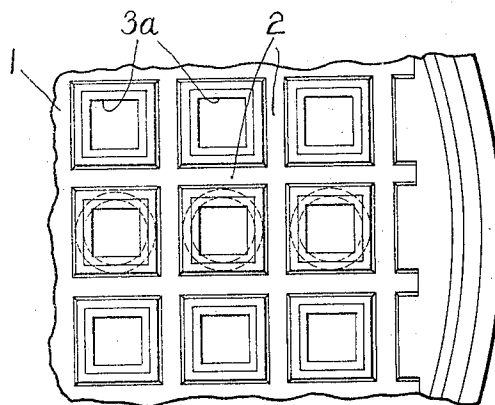


Fig. 3.



Witnesses:
 Leonard W. Novander.
 George E. Higham.

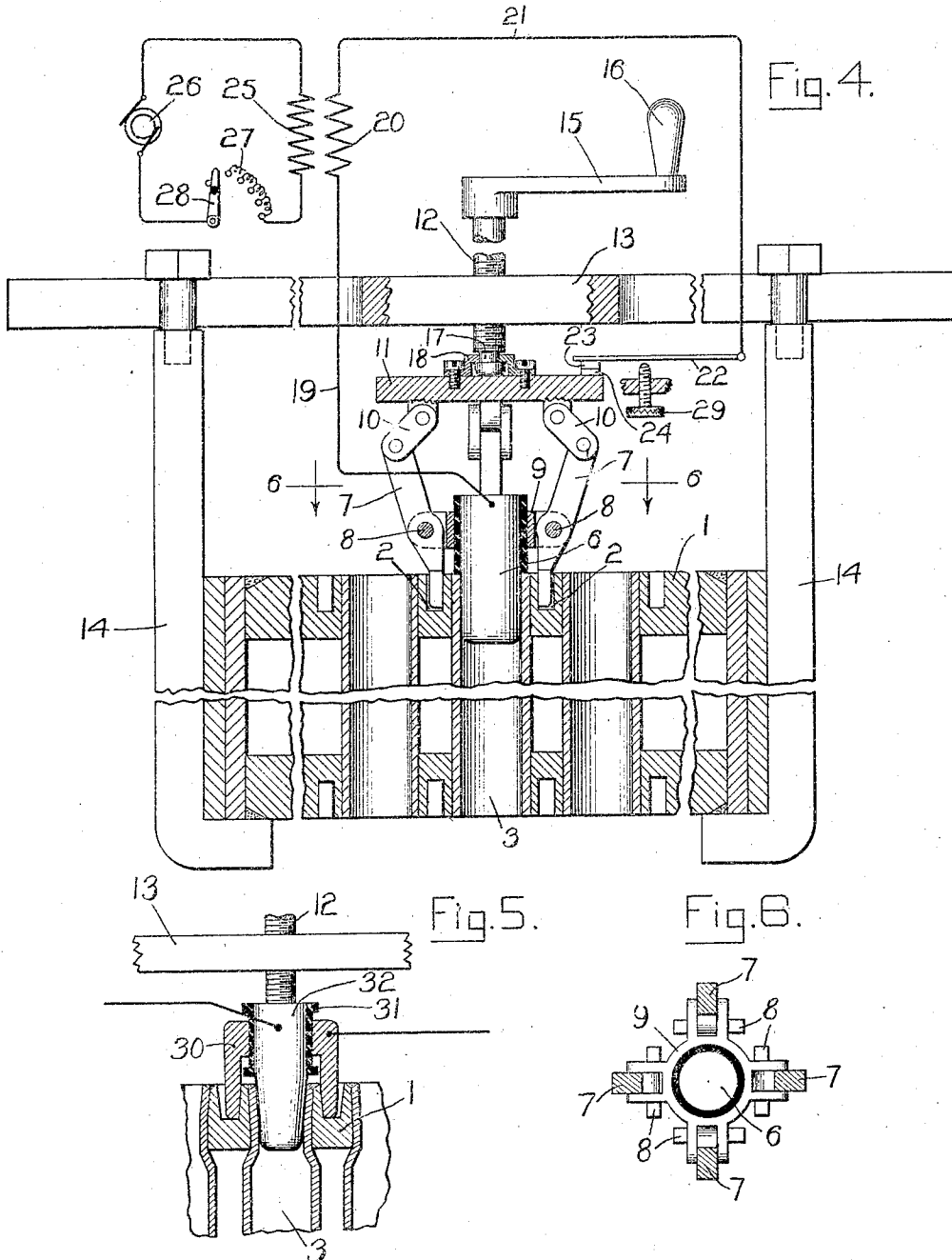
Inventor
 Charles A. Brown
 By *Brown & Williams*
 Attorneys

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 Attorneys

UNITED STATES PATENT OFFICE.

CHARLES A. BROWN, OF HINSDALE, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE STEAM POWER DEVICES COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

BOILER CONSTRUCTION AND MEANS FOR MAKING THE SAME.

1,008,628.

Specification of Letters Patent.

Patented Nov. 14, 1911.

Application filed August 1, 1910. Serial No. 574,805.

To all whom it may concern:

Be it known that I, CHARLES A. BROWN, a citizen of the United States, residing at Hinsdale, in the county of Dupage and State of Illinois, have invented certain new and useful Improvements in Boiler Construction and Means for Making the Same, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to an improved process for securing the flues in the heads of a boiler adapted to be used to produce steam under pressure to operate a steam engine, and is particularly applicable for small portable boilers used upon automobiles.

My invention also provides an improved means for carrying out this process. In the construction of boilers of the class referred to it is particularly desirable that the joints between the parts be made as nearly homogeneous as possible, and, further, that the joints be perfectly tight and of sufficient strength so that the high pressures frequently developed in the boilers will not cause leaks at the joints nor separation of the parts.

By my invention I employ an improved form of electric welding apparatus, particularly adapted to engage the boiler flues and heads so that such parts may be uniformly and properly heated to the welding point, at which time they are caused to properly unite by the application of suitable pressure.

The several drawings illustrating my invention are as follows:

Figure 1 shows in plan view a boiler head adapted to be secured by my invention to the boiler flues; Figs. 2 and 3 show modified constructions of boiler heads, which may be secured with equal facility to the boiler flues as the construction indicated in Fig. 1; Fig. 4 is a vertical sectional view through the boiler shown in Fig. 1, taken along the line 4—4, and in this figure in addition there is shown the apparatus in place in engagement with a boiler flue and the upper head for electrically welding such parts together; Fig. 5 shows a modified form of apparatus for exerting suitable pressure upon the parts to force them together when at the welding

temperature; and Fig. 6 is a sectional view taken along the line 6—6 of the welding terminals shown in Fig. 4.

As shown in Fig. 1, the head 1 has formed therein a plurality of channels 2 between the flues 3, and at the intersections of the channels 2 clearance openings 4 are drilled to produce flanges about the ends of the flues 3 of substantially the thickness and conductivity of the ends of the flues 3. In the modification shown in Fig. 2 a similar result is produced by forming outstanding flanges 5 from the head 1 of the boiler by suitable dies, which flanges are adapted to engage and fit around the ends of the flues 3 in practically the same manner as do the flanges shown in Fig. 1.

In the modification shown in Fig. 3, the ends of the flues 3^a are squared, as a result of which the channels 2 made in the head of the boiler 1 serve to make the flanges around the ends of the flues 3^a without the use of the clearance openings 4 employed in connection with the construction shown in Fig. 1.

In Fig. 4 a plug 6 of conducting material, preferably copper, is shown in place in the upper end of one of the flues 3, and clamping jaws 7, also of conducting material, preferably copper, pivoted at 8 to a collar 9, supported by but insulated from the plug 6, engage the channels 2 adjacent to the end of the flue 3 in which the plug 6 is located. The upper ends of the clamping jaws 7 are pivotally connected by links 10 with a plate 11, to which is rotatably secured the lower end of a screw 12 threaded through a bar 13 held in place by suitable clamps 14 extending around the lower head of the boiler. The screw 12 has secured to its upper end a crank 15 and an operating handle 16 by which such screw may be rotated. The lower end of the screw 12 is grooved, as indicated at 17, and is engaged by a retaining plate 18 secured to the top of the plate 11, so that the plate 11 is caused to move in either direction according to whether the screw 15 is moved up or down. The plug 6 is connected by a wire 19 with the secondary winding 20 of a transformer, the other terminal of which is connected by a wire 21 with a switch spring 22. The switch spring 22 carries a contact 23 normally engaging a

contact 24 carried by the plate 11, as a result of which the wire 21 is normally in contact with the clamping jaws 7. The secondary winding 20 of the transformer is in inductive relation with the primary winding 25, which is in circuit with the generator 26 and the regulating resistance 27 controlled by means of the switch arm 28.

In operating my device, the plug 6 is placed in the upper end of one of the flues 3 and the clamping jaws 7 are placed in the adjoining channels 2, and after the clamps 14 are disposed around the lower head of the boiler the screw 12 is turned down until the jaws 7 are firmly in contact with the flange around the end of the flue 3 to be welded. The switch arm 28 is then moved to include the proper amount of resistance 27 in circuit with the primary winding 25 of the transformer, and when the portions of the flue and head between the plug 6 and the jaws 7 have been heated to the welding point, the handle 16 is rotated, and by means of the screw 12 increased pressure is exerted upon the clamping jaws 7, which, owing to the plastic condition of the highly heated metal between the clamping jaws 7 and the plug 6 yield to force the head and the end of the flue into intimate molecular engagement, thus effecting the weld. At the same time that the plate 11 is moved downward to force the parts of the head and flue together the contact spring 22 engages the upper end of the screw 29, which causes separation of the contacts 23 and 24, thus interrupting the circuit through the plug 6 and the jaws 7, which interrupts the heating operation. The same operation is then repeated in connection with the other flues of the boiler. The screw 29 is adjustably supported in any suitable manner, not shown, so that the opening of the circuit through the plug 6 and the jaws 7 may be caused for any desired degree of compression of the parts welded together.

In the modification shown in Fig. 5, the jaws 7 are replaced by a tubular contact member 30, which may be of a proper conformation to engage the flange on the boiler head surrounding the end of the flue to be welded. This tube 30, which is of conducting material, preferably copper, is loosely supported by suitable insulation 31 from a plug 32, which plug is of conducting material, preferably copper, and tapered at its lower end, and so conformed as to engage the upper end of the flue 3, which has preferably been first expanded somewhat, when the tube 30 occupies nearly or quite its lower position on the insulating bushing 31. The plug 32 is connected directly with the screw 12, as a result of which, when the proper temperature has been reached of the parts to be welded, motion of the screw 12 downward forces the plug 32 into the end of the

flue 3, thus forcing such end of the flue into welding engagement with the flange of the boiler head surrounding it.

While I have shown my invention in the particular embodiments herein described I do not, however, limit myself to these means for carrying out my invention, but desire to claim any equivalents that may suggest themselves to those skilled in the art.

What I claim is:

1. The process of securing flues to the head of a boiler, consisting in placing a flue in position against the head, completing an electric circuit through the flue and head to weld the same together and exerting lateral pressure upon the flue.

2. The process of securing flues to the head of a boiler, consisting in placing a flue in a suitable aperture in the head, completing an electric circuit through the flue and head to weld the same together, and pressing the flue laterally against the head when the parts are at a welding temperature.

3. The process of securing flues to the head of a boiler, consisting in grooving the head between the flue openings, placing a flue in one of such openings, placing clamps in the grooves around the flue and a conducting plug in such flue, and completing an electric circuit through the flue and head by means of the plug and clamps.

4. The process of securing flues to the head of a boiler, consisting in grooving the head between the flue openings, placing a flue in one of such openings, placing clamps in the grooves around the flue and a conducting plug in such flue, completing an electric circuit through the flue and head by means of the plug and clamps, and pressing the flue and head together by means of the clamps when the parts are at a welding temperature.

5. The process of securing flues to the head of a boiler, consisting in grooving the head between the flue openings, placing a flue in one of such openings, placing clamping jaws in the grooves around the flue and a conducting plug in such flue, completing an electric circuit through the flue and head by means of the plug and clamps, and forcing the jaws and head in against the flue when the parts are at a welding temperature.

6. As a means for securing flues to the head of a boiler, a conducting plug adapted to fit in the end of a flue, a clamp adapted to engage the head, an electric circuit terminating in the plug and clamp, and means for displacing the plug and clamp relatively to each other to press the flue and head together.

7. As a means for securing flues to the head of a boiler, a conducting plug adapted to fit in the end of a flue, a clamp adapted to engage the head, an electric circuit terminat-

ing in the plug and clamp, means for displacing the plug and clamp relatively to each other to press the flue and head together, and means for opening the circuit by such relative displacement between the plug and clamp.

8. As a means for securing flues to the head of a boiler, a conducting plug adapted to fit in the end of a flue, clamping jaws adapted to engage a flange on the head around the flue, an electric circuit terminating in the plug and jaws, and means for forcing the jaws toward the flue against the head.

9. As a means for securing flues to the head of a boiler, a conducting plug adapted to fit in the end of a flue, clamping jaws adapted to engage a flange on the head around the flue, an electric circuit terminating in the plug and jaws, means for forcing the jaws toward the flue against the head, and a switch actuated by the jaw operating means.

10. As a means for securing flues to the head of a boiler, a conducting plug adapted to fit in the end of a flue, and a clamp adapted to engage a flange on the head around the flue.

11. As a means for securing flues to the head of a boiler, a conducting plug adapted to fit in the end of a flue, a clamp adapted to engage the head, and means for displacing the plug and clamp relatively to each other.

12. As a means for securing flues to the head of a boiler, a conducting plug adapted to fit in the end of a flue, pivoted jaws for engaging a flange on the head around the flue, and means for forcing such jaws toward the plug.

In witness whereof, I hereunto subscribe my name this 30th day of July, A. D., 1910.

CHARLES A. BROWN.

Witnesses:

ALBERT C. BELL,
ROBERT F. BRACKE.