

(No Model.)

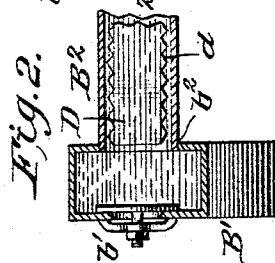
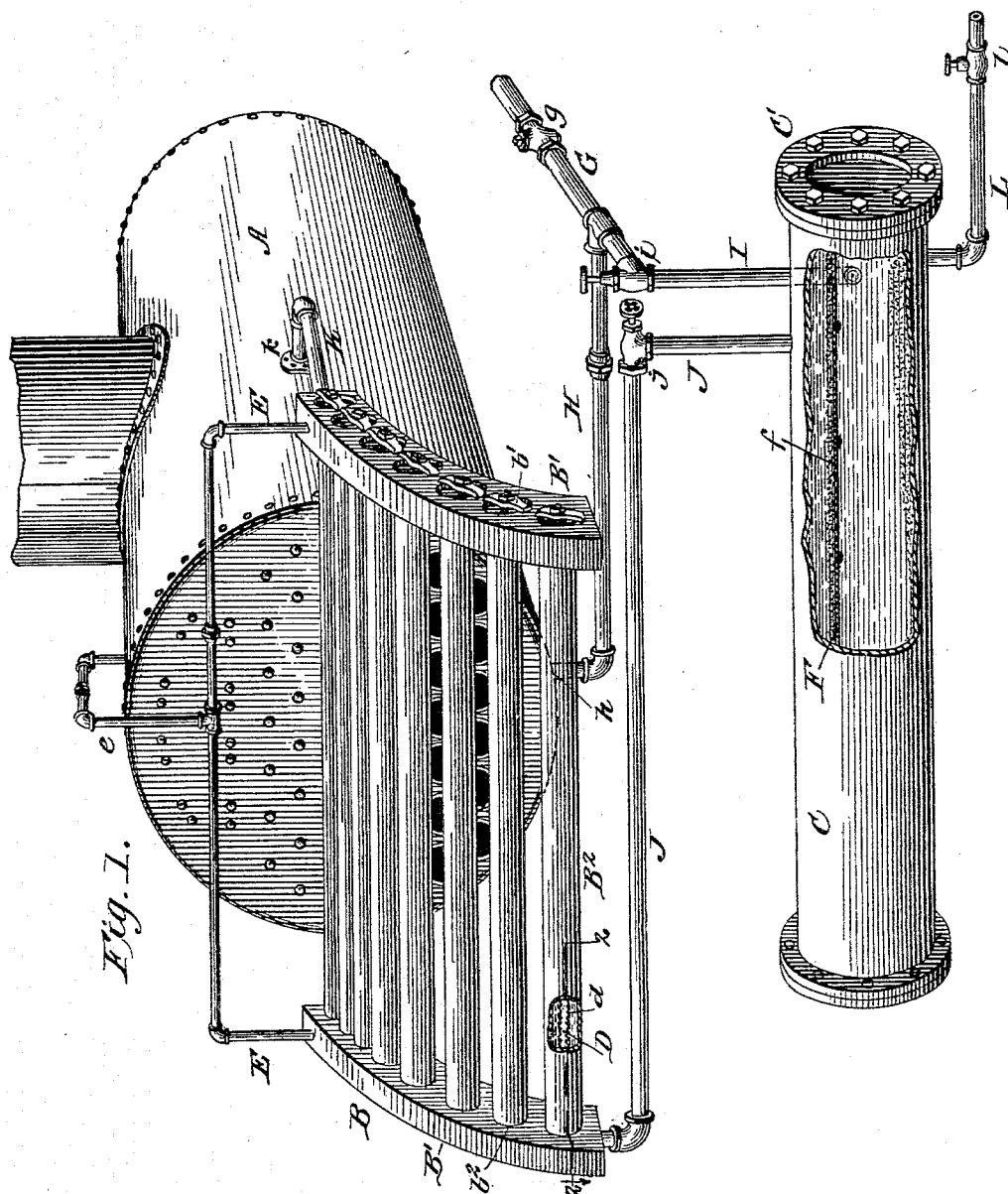
2 Sheets—Sheet 1.

G. W. COLLIN.

ARCH SUPPORT, WATER PURIFIER, AND HEATER.

No. 514,349.

Patented Feb. 6, 1894.



WITNESSES:

Fred G. Dieterich
P.B. Turpin.

INVENTOR

George W. Collins
BY *Munn & Co.*
ATTORNEYS.

(No Model.)

2 Sheets—Sheet 2.

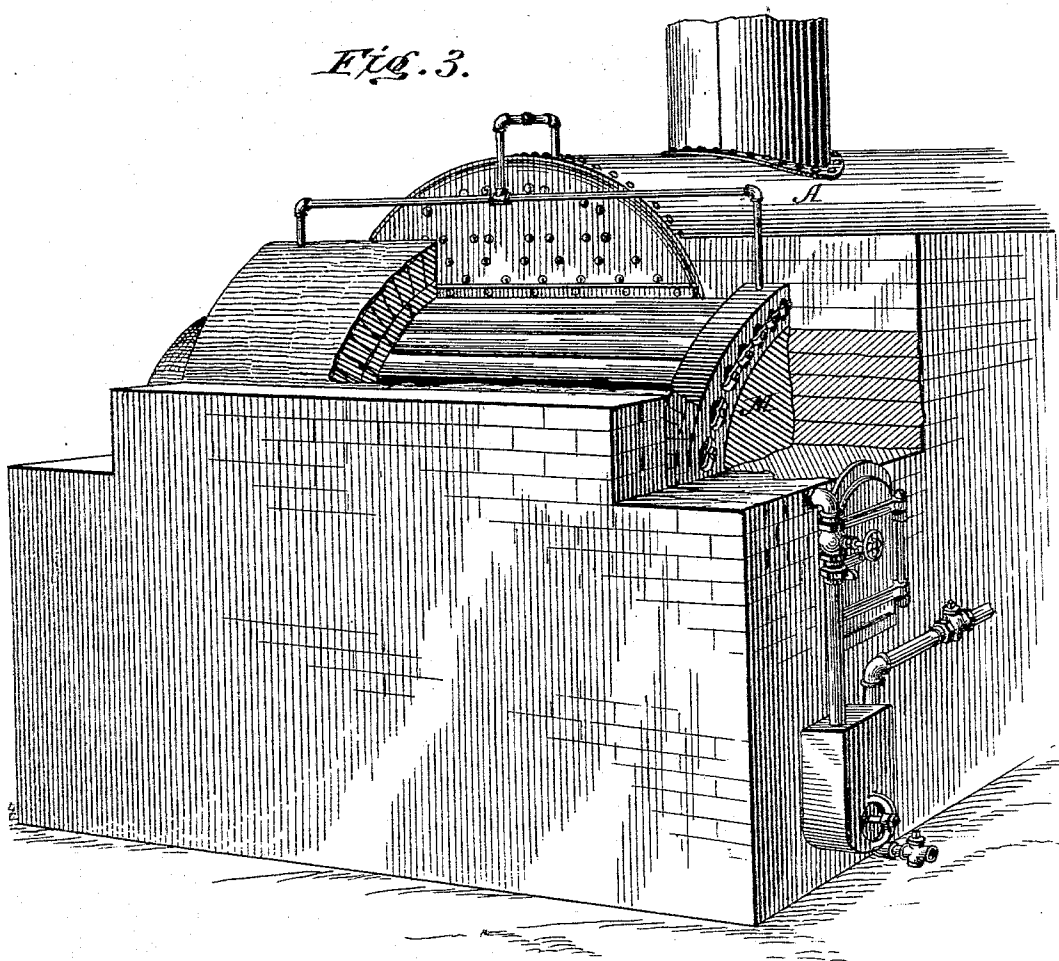
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Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE W. COLLIN, OF CORDELE, GEORGIA, ASSIGNOR OF ONE-HALF TO
JOHN W. BULLA, OF SAME PLACE.

ARCH-SUPPORT, WATER PURIFIER AND HEATER.

SPECIFICATION forming part of Letters Patent No. 514,349, dated February 6, 1894.

Application filed May 1, 1893. Serial No. 472,560. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. COLLIN, of Cordele, in the county of Dooly and State of Georgia, have invented a new and useful Improvement in Arch-Support, Water Purifier and Heater, of which the following is a specification.

My invention is an improvement in arch supports, water purifiers and heaters and is in the nature of an attachment or apparatus for use in connection with the ordinary boiler, which will serve as an efficient arch support, as a feed water heater, as an auxiliary steam generator, and will also efficiently aid in securing the best results in cleaning the boiler by blowing off.

The invention consists in the novel constructions and combinations of parts as will be hereinafter described and pointed out in the claims.

In the drawings—Figure 1 is a perspective view of the improved apparatus partly broken away. Fig. 2 is a detail section on about line 2—2 of Fig. 1, and Fig. 3 is a perspective view of a part of a furnace and boiler, the brick work of the furnace being partly broken away.

The boiler A may be of ordinary construction and at the end thereof and immediately over the flues I support what may for convenience of reference be termed the heater B the mud drum C being on a lower level than the heater and all being connected in the manner more fully described hereinafter. The heater B is formed with the end columns or chambers B' B' and the connecting pipes B². The columns B' are curved from end to end corresponding to the curvature of the furnace arch and are provided in their inner faces with openings at b² into which the ends of the pipes B² are secured by expanding them therein or otherwise as desired. In their outer sides and opposite the openings b² and the ends of the pipes B² I form hand holes b' closed in use by the removable cover plates which may be removed to permit access to the interior of the columns or to facilitate cleaning the tubes B² as may be desired. Manifestly these cover plates may be of any desired construction and may be secured in any suitable manner.

In use the heater comprising the columns and the connecting pipes is supported by resting its curved end columns upon the walls M of the furnace the outer sides of the said columns being exposed so convenient access may be had to the hand holes. When so supported the heater forms a firm base support for the furnace arch which may be built directly upon the end columns and tubes of the heater as will be readily understood. In each of the tubes B² I place a strip D of sheet copper fitting it in the tube so it will be self supporting by engaging at its edges with the tube and I serrate such edges at d to permit the circulation of water past such edges and also to reduce the liability of the plates becoming firmly fastened at their edges to the inside of the tubes by the lime and other deposits. It should be understood that the purpose of these plates D is to take up lime and the like from the water to prevent scale in the boiler the copper plates having a greater affinity for such scale elements than the metal of the heater and boiler as is well understood. When the plates have become covered with scale they may be replaced by others and if they should be connected at any point to the tubes they may be knocked loose with a slight tap of a hammer. At its upper end the heater is connected by suitable pipes with the steam space of the boiler so the steam generated in the heater will pass into the boiler and directly into the steam space. This connection is preferably effected by the pipes E leading from the upper ends of the column E' and uniting with a single pipe e which discharges into the top or upper portion of the boiler as shown.

The mud drum C which may generally be of ordinary construction is provided with a copper plate F having serrated edges and fitted in the drum for the purpose of attaching the scale producing elements.

The water or supply pipe G is provided with a valve g and has a branch H leading to and opening at h into the bottom of the boiler and is also provided with a branch or portion I leading to the mud drum and having a valve i.

A pipe J is provided with a valve j and connects the mud drum with the lower end of one of the columns B' a pipe K leading

from the upper end of the opposite columns B' and opening at *k* into the boiler at about or just below the lower water line. The mud drum has an escape or discharge pipe L provided with a valve *l*.

It will be seen that by my improvement I form a support for the arch of a return flue boiler, or a like arch in similar arrangement for a heater of feed water a generator of steam, and water purifier and mud separator.

In operation the boiler is filled with water to the water line (valve *l* closed, and valve *j* open). The fire is built in furnace, and heat and flames of combustion pass back under boiler, up against pipes B² B² and back through the boiler tubes. The water in pipes B² B² quickly becomes heated rises through pipe K into boiler at *k*, thus getting up a circulation of water from the bottom of boiler at *h* through pipes H and I, mud trap C and pipe J into distributing columns B' B' and tubes or pipes B² B² into boiler through pipe K making a constant current one way through my device and boiler in one direction up through the arch support or heater and its connections. When feeding water to the boiler from the feed pipe G the water is forced through the pipe I into the mud trap C and is taken up by the current formed in the arch support or heater and passes into boiler at *k* at high temperature. The pipes E allow steam to pass the top of columns B' B' into the steam space of the boiler. The valves *j* and *i* always remain open, except when cleaning out mud trap C, when they are closed. When blowing off surface water in the boiler valve *i* is closed and valve *l* is opened.

In blowing off water from the bottom of the boiler, valve *j* is closed and valve *l* opened. When cleaning out the mud trap F the valves *j* and *i* are closed and the head C' of the mud trap is removed. In cleaning out columns B' B' and pipes or tubes B² B² the cover plates at *b'* are removed, permitting convenient access to such parts.

By my improvement I attain a secure arch support so arranged that the water may freely circulate through it to avoid any burning or bending from overheating, and by the arrangement of pipes connecting the several parts as shown and described I have a constant and free circulation from the bottom of the boiler at *h* to the upper connection with the boiler at *k* whether feeding or not and it follows up the course taken by the water that is through mud trap and arch support or heater and into the boiler at *k* heated to steaming point by its passage through the heater thus furnishing an efficient feed water heater. By the described circulation the sediment is drawn from the bottom of boiler into the mud trap the boiler being thus kept free from deposit on sheet over the fire.

It will be understood that in addition to the use of the invention as an arch support for

tubular boilers, the improvement, may be used on lime kilns, coke ovens and other furnaces requiring a return arch support.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A water heater and arch support for boilers consisting of the curved end reservoir columns, extended practically from base to crown of the arch and the pipes extending between and communicating at their ends with the said columns substantially as set forth.

2. A water heater and arch support for boilers consisting of the end reservoir columns curved longitudinally and provided in their outer sides with hand openings, closures for such openings, and the tubes connecting said columns and opening into the inner sides thereof opposite the hand openings substantially as set forth.

3. An improved arch support for boiler furnaces which consists of hollow end reservoir columns curved longitudinally and pipes connecting and opening at their opposite ends into said end columns in combination with the boiler and connections between said arch support and boiler substantially as set forth.

4. A combined water heater and arch support for boilers which consists of the separate end reservoir columns extended practically from base to crown of the arch, curved longitudinally and provided with water and steam connections and the pipes extending between and communicating at their ends with the said end columns, all substantially as and for the purposes set forth.

5. The combination with the boiler and the mud drum, of the heater having longitudinally curved end columns and cross or connecting tubes opening at their ends into said columns, the water connections, and the steam connections between the upper end of the heater and the steam space of the boiler all substantially as and for the purposes set forth.

6. In combination substantially as described, the boiler, the mud drum and the heater, the feed pipe branched in advance of the mud drum and having separate branches leading to the mud drum and to the boiler, the water pipe connecting the drum and heater, a water pipe connecting the heater and boiler and a steam connection between the upper end of the heater and the steam space of the boiler substantially as set forth.

7. The combination of the boiler, the heater, the drum, the pipe G having branch H and branch I provided with a valve *i*, the pipe J connecting the drum and heater and having a valve *j* and the pipe K connecting the boiler and heater all substantially as described whereby the valves may be manipulated to blow off from the top or bottom of the boiler as and for the purposes specified.

8. In an apparatus substantially as de-

scribed a sediment accumulating plate formed of copper and having its opposite edges serrated substantially as set forth.

5 9. The combination substantially as described of the boiler, the heater having curved end columns B' and connecting tubes B², the water pipe K connecting the upper end of the heater with the boiler, the steam connections leading from the upper end of the heater
10 to the steam space of the boiler, the drum, the pipe J connecting the drum and heater, and the pipe G having branches H² and I leading respectively to the boiler and to the drum all substantially as set forth.

10. The combination of the boiler the side 15 walls M of the furnace the heater having curved end columns resting upon said side walls and tubes B² connecting said end columns and the arch built directly upon and supported by said heater substantially as set 20 forth.

April 17, 1893.

GEORGE W. COLLIN.

Witnesses:

V. L. EMERSON,
FRED HARDER.