F. CONRATH.

COUPLING FOR SUPERHEATERS.

APPLICATION FILED DEC. 15, 1910.

1,086,807.

Patented Feb. 10, 1914.

2 SHEETS—SHEET 1.

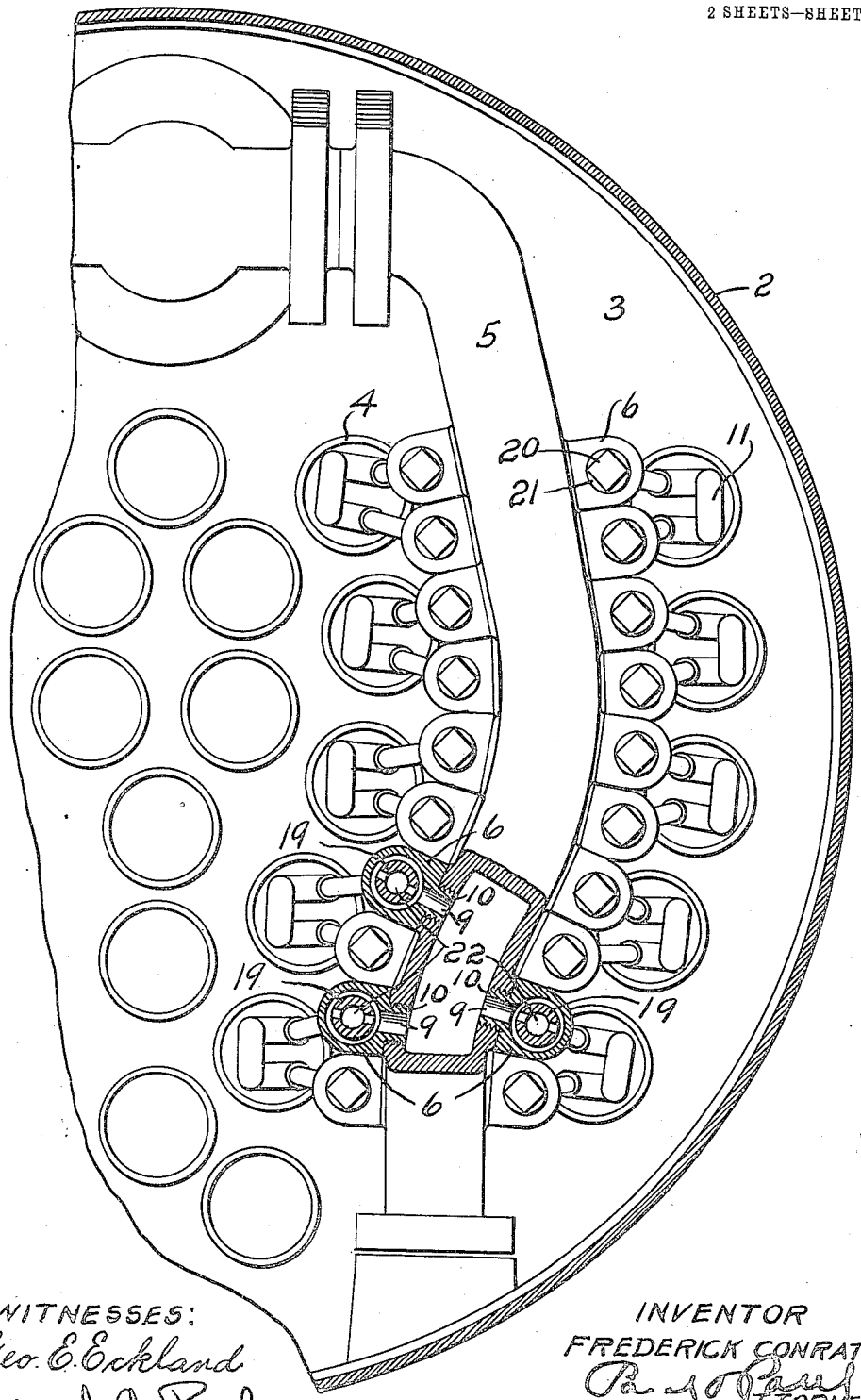


FIG. 1.

WITNESSES:

Geo. E. Eckland

Edward A. Paul

INVENTOR

FREDERICK CONRATH

Paul & Paul

ATTORNEYS

BY Richard Paul

F. CONRATH.

COUPLING FOR SUPERHEATERS.

APPLICATION FILED DEC. 15, 1910.

1,086,807. Patented Feb. 10, 1914

2 SHEETS—SHEET 2.

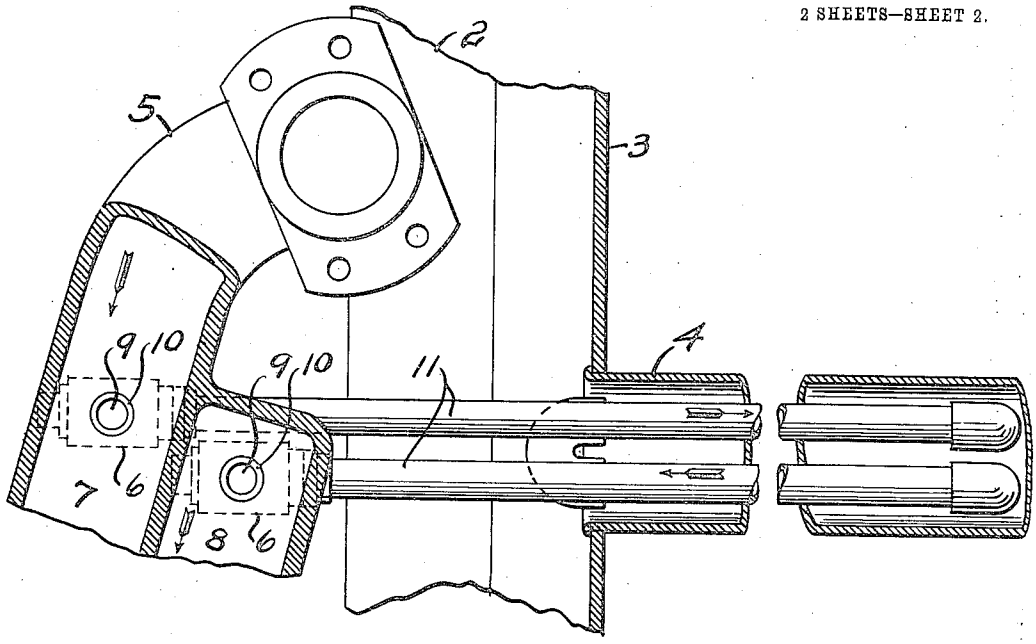


FIG. 2.

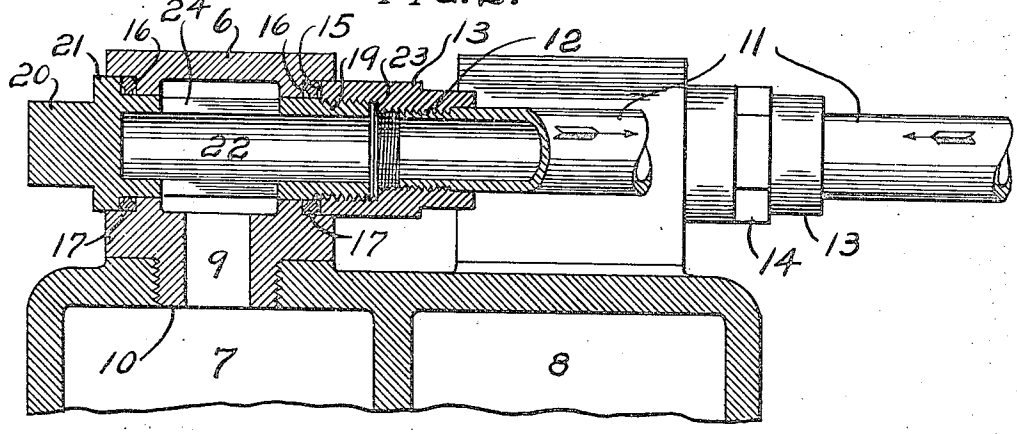


FIG. 3.

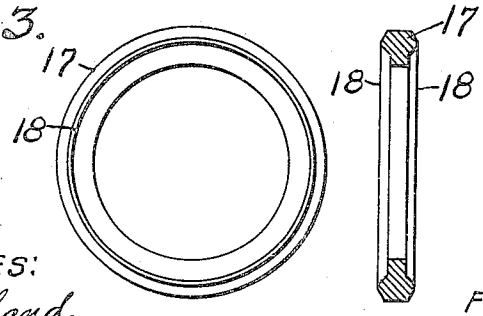


FIG. 4. FIG. 5.

WITNESSES:

Geo. E. Eckland

Edward A. Paul

INVENTOR

FREDERICK CONRATH

Paul & Paul

ATTORNEYS

BY Richard Paul

UNITED STATES PATENT OFFICE.

FREDERICK CONRATH, OF ST. PAUL, MINNESOTA, ASSIGNOR OF ONE-HALF TO GEORGE H. EMERSON AND ONE-HALF TO HENRY YOERG, BOTH OF ST. PAUL, MINNESOTA.

COUPLING FOR SUPERHEATERS.

1,086,807. Specification of Letters Patent. Patented Feb. 10, 1914.

Application filed December 15, 1910. Serial No. 597,583.

To all whom it may concern:

Be it known that I, FREDERICK CONRATH, of St. Paul, Ramsey county, Minnesota, have invented certain new and useful Improvements in Couplings for Superheaters, of which the following is a specification.

In the superheater now in use a means of connection between the superheater casting and the tubes is shown, which consists in providing bosses on the walls of the casting having sockets to receive the ends of the superheater tubes and pockets communicating with said tubes and with the chambers respectively of the casting. These bosses are staggered so that each one is accessible from the front of the superheater without disturbing the connections of the other bosses.

The object of my present invention is to improve the means for connecting the bosses with the superheater tubes so that it will be unnecessary to cut off the end of the tube and back the cut-off end out of the boss, an ordinary wrench being the only tool required in my invention to separate the tube from the boss.

My invention consists generally in various constructions and combinations, all as hereinafter described and particularly pointed out in the claims.

In the accompanying drawings forming part of this specification, Figure 1 is a front view of a portion of a boiler showing one section of the superheater and illustrating the manner of mounting the bosses on the casting, Fig. 2 is a detail view on a section line substantially at right angles to the view in Fig. 1, showing the relative position of the superheater casting, the flue sheet and the flue, Fig. 3 is a detail sectional view illustrating the details of my improved coupling, Figs. 4 and 5 are detail views of the form of gasket which I prefer to employ.

In the drawing, 2 represents the boiler, 3 the flue sheet and 4 the flues into which the superheater tubes are inserted.

5 is one section of the superheater, a similar section being provided on the other side of the longitudinal center of the boiler. I have not thought it necessary to illustrate this other section herein, it being sufficient to state that both of these sections or castings are provided with saturated and superheated steam chambers, 7 and 8, communicating respectively with pockets in the alternate bosses through passages 9. These passages are formed in projections 10 on the bosses which are tapped into the walls of the superheater section or casting in the usual way.

11 represents a superheater tube having a loop formed therein with a return bend and inserted into the flue in the boiler and provided with a threaded end 12 fitting a coupling 13. This coupling is preferably provided with an outer surface 14 that is adapted to receive a wrench. The outer end of the coupling is provided preferably with a flat face 15 fitting a socket 16 in one face of the boss 6 and between the flat face 15 and the inner wall of the socket is a gasket 17, preferably of metal, having annular ribs 18 formed on each side thereof. These ribs contact with the flat face 15 and with the bottom of the socket and form narrow bearing surfaces which will seat themselves snugly against the bottom of the socket and the surface 15 and form a steam tight joint at that point. I prefer to provide these ribs to avoid broad contacting surfaces on which dirt or sediment might collect and prevent the formation of a steam tight joint between the abutting parts. The use of this all metal gasket enables me to dispense with the usual asbestos gasket or one of copper, both of which have been found to be unsuitable for this purpose because of their non-wearing characteristic and even if the asbestos gasket should be fairly durable the heat of the steam is so intense that it will soon burn it out.

The outer end of the coupling 13 is interiorly threaded to receive the exteriorly threaded end of a plug 19 which has an end 20 adapted to receive a wrench and a flange 21 which fits within a socket in the wall of the boss corresponding to the socket just described and which I will designate by the same reference numeral. I also provide at this point another gasket, preferably the same as the one described and having the same function. The plug 19 has a chamber 22 therein communicating with the superheater tube and I may provide a shoulder 23 in the coupling 13 with which the end of the plug 22 contacts when the parts are assembled. The walls of the plug 22 have slots 24 therein leading from the chamber 22 to the passage 9. The other end of the superheater tube is mounted in its boss in a similar manner.

With this construction, to remove the tube from the superheater casting it will only be necessary to hold the coupling 13 from turning by a suitable means, apply a wrench to the end 20 until the plug 19 is loosened and when it is withdrawn from the coupling 13 the superheater tube is entirely free from its connection with the superheater section without the necessity of cutting the tube or damaging it in any way and it may then be readily removed from the boiler flue. Evidently the separation of the tube from the header where this construction is employed is a comparatively simple matter and will only require a very few moments' time, and as the ends of each tube are connected with the header on the same side it is evident that any tube can be removed from its flue and header without disturbing the other tubes or the header castings.

I am aware that the details of my improved coupling may be modified in various ways and still be within the scope of my invention and I do not, therefore, wish to be confined to the details of the various connections as herein shown.

I claim as my invention:—

1. A superheater header having saturated and superheated steam chambers formed therein, and hollow external projections having holes in their outer walls and communicating with said chambers respectively, superheater tubes, couplings connecting said superheater tubes with said projections, said couplings comprising members fitting within the holes in the walls of said projections and seated at one end therein, and second coupling members seated in the walls of said projections at the other ends of said first named members, and connecting said first named coupling members and said superheater tubes, the seating of said second members simultaneously seating said first named members and drawing them and said superheater tubes together.

2. A superheater header having saturated and superheated steam chambers formed therein and projections thereon having pockets communicating respectively with said chambers, said projections having sockets to receive the ends of a superheater tube, gaskets interposed between said ends and the bottoms of said sockets, and plugs fitting into holes in said projections and having threaded connections with said tubes and provided with passages communicating with said tubes and said pockets.

3. A superheater header having saturated and superheated steam chambers formed therein and external projections having holes therethrough and pockets therein communicating respectively with said chambers, hollow plugs fitting within the holes in said projections, a superheater tube, said plugs having means for the application of an operating tool thereto at one end and connections with the ends of said superheater tube at the other end, and metallic gaskets having annular ribs thereon provided between said tube ends and the walls of said projections.

4. A superheater header having saturated and superheated steam chambers formed therein and external projections provided with holes therethrough and internal pockets communicating respectively with said chambers, said holes having sockets on each side of said projections, superheater tubes having ends fitting into the sockets on one side of said projections, plugs fitting into said holes on the other side of said projections and having threaded connections with the ends of said tubes and having passages communicating with said tubes and with said pockets, and gaskets interposed between said plugs, the ends of said tubes and the bottoms of said sockets.

5. A superheater header having saturated and superheated steam chambers formed therein and external projections having holes therethrough and pockets communicating respectively with said chambers, hollow plugs fitting within said holes and communicating with said pockets, superheater tubes having threaded connections with said plugs and communicating with said pockets through said plugs, the removal of said plugs from said projections allowing separation of said tubes from said projections.

6. The combination, in a superheater with a header having a steam compartment therein and an external projection on said header having a pocket communicating through the wall of said header with said steam compartment, said projection having an opening extending therethrough in a plane substantially parallel with the exterior wall of said header, of a superheater tube having a threaded end that is arranged in line with the opening in said projection, a plug arranged in said opening and provided at one end with a shoulder bearing against the wall of said projection around said opening, and a sleeve at the opposite end of said plug connecting the end of said plug and the end of said superheater tube, the shoulder on said plug and the end of said sleeve forming steam-tight joints with said projections, substantially as described.

7. In a superheater, the combination, with a header having a steam compartment therein and an external projection provided with a pocket communicating through the wall of said header with said steam compartment, said projection having an opening therethrough and seats at each end of said opening, of a superheater tube having a threaded end arranged in line with the opening in said projection and a coupling having means for connection with the threaded end of

said tube and extending through said opening and forming steam-tight joints with the seats at the ends of said opening.

8. In a superheater, the combination, with a header having a steam compartment therein, and an external projection provided with a pocket communicating through the wall of said header with said steam compartment, said projection having openings in its walls on opposite sides of said pocket, and recesses extending around said openings, of a superheater tube having a threaded end in line with said openings and a coupling device connecting said tube with said projection, said coupling device including a hollow plug fitting within the openings in said projection and having ports communicating with said pocket and a shoulder to enter the recess of one opening, and an exteriorly threaded sleeve adapted to receive the end of said tube and said plug and seated in the recess around the other opening.

In witness whereof, I have hereunto set my hand this 1st day of December 1910.

FREDERICK CONRATH.

Witnesses:
C. H. REHFUSS,
G. E. SORENSEN.