June 28, 1927. 1,633,674

T. E. MURRAY

BOILER

Filed July 10, 1922

Fig. 1.

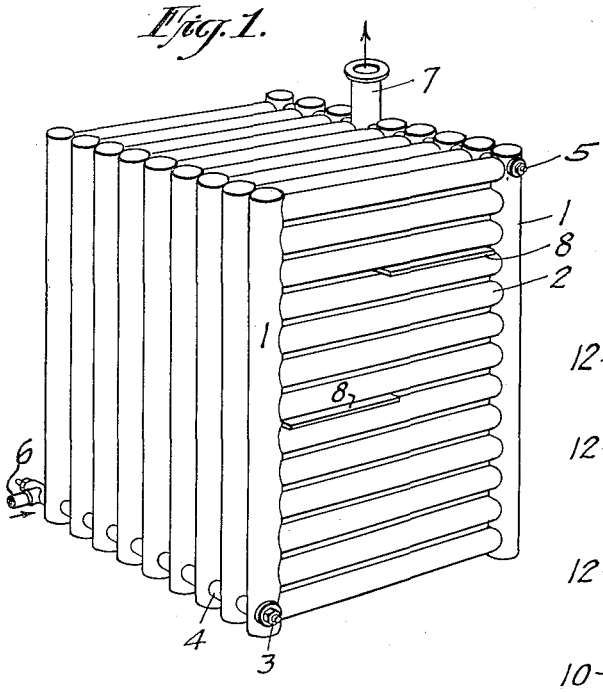


Fig. 2.

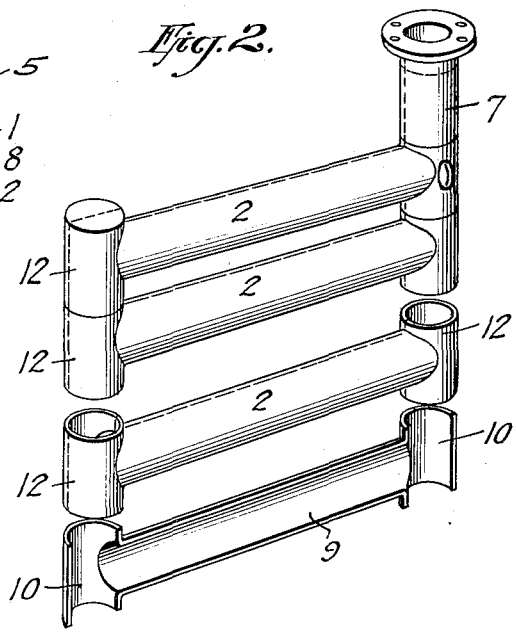
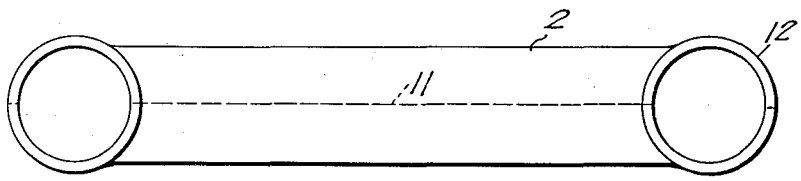


Fig. 3.



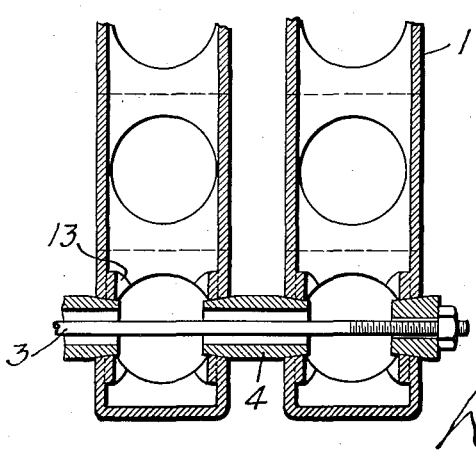


Fig. 4.

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UNITED STATES PATENT OFFICE.

THOMAS E. MURRAY, OF BROOKLYN, NEW YORK.

BOILER.

Application filed July 10, 1922. Serial No. 573,928.

The invention aims to provide boilers or the like and tubular units for the building up of boilers and other structures, and to provide a method of manufacture by which such structures can be produced very economically.

The invention is primarily designed for low pressure service, but it may be used for high pressure with very slight modification.

The accompanying drawings illustrate an embodiment of my invention.

Fig. 1 is a perspective view of the tubular part of a boiler;

Fig. 2 is a similar view of parts used in making up one of the units thereof;

Fig. 3 is a plan of one of the sections which go to make up the several units of the boiler;

Fig. 4 is a vertical section through the lower ends of two of the tubular headers.

Referring to the embodiment of the invention illustrated, the boiler comprises a number of units each comprising a pair of vertical tubular headers 1 communicating with each other through horizontal tubes 2. The headers 1 at one side are fastened together at their lower ends by means of a rod 3 (see Fig. 4) passing through them and through tapered thimbles 4 by which they are spaced apart; the headers 1 at the opposite side being similarly fastened to each other by a rod 5 passing through their upper ends; thus leaving the parts sufficient freedom for expansion. They may be joined together in various other ways as, for example, by a common manifold.

Water is admitted to the bottoms of the front row of headers through a pipe 6 and is carried off through an extension 7 at the top of one of the rear line of headers. Or the water may flow in the opposite direction or through various other known styles of connection.

I have assumed also that the path of the gases is upward through the tubular part of the boiler, although this arrangement too may be modified. The necessary safety valve or valves, gages, water glass and other accessories, the casing and the firing equipment for coal, gas, coke, wood, oil or other fuel, may be of any usual or suitable type, and are, therefore, not illustrated.

The arrangement described permits of a very simple and effective baffling. For this purpose I use steel or iron plates 8 laid on the horizontal tubes wherever necessary to deflect the heating gases and to direct them along the most efficient path. These baffles are easily shifted to suit varying conditions, and increased or decreased in number as may be found best.

According to my invention the boiler is built of pressed steel sections, which have very considerable advantages as compared with the cast iron sections commonly used, particularly for low pressure heating. The pressed steel sections do not crack like cast iron and are considerably lighter. Also practically all the tubular parts are cylindrical in cross-section, which utilizes most efficiently the strength of the material. The result is a boiler of light weight and of greater strength and durability than cast iron.

Not only are the parts of pressed steel but they are united by welding with the smallest possible number of joints so as to make their manufacture economical and to make the product most reliable. Fig. 2 shows the method of manufacture.

Each section is formed of two sheet metal segments of the character shown at the bottom of the figure. It is stamped or pressed from a single integral sheet of metal, with a central part 9 constituting one-half of a horizontal tube divided on a vertical diametral plane and with ends 10 which constitute halves of vertical tubes divided on the same plane. Two such segments are butt welded to each other along their edges as shown by the dotted line 11 Fig. 3. This welding operation produces a complete section comprising a horizontal tube 2 with a short vertical tube 12 on each end. A number of such sections are built up by superposing them on one another as shown in the upper part of Fig. 2 and butt welding the short tubes 12 to each other. A series of the tubes 12 thus constitute a header 1; and these headers are closed at the top and bottom by plates welded thereon or attached in any other of numerous known ways. At one end of each header there are transverse openings as shown in Fig. 4 for the connecting nipples or other fastenings. With thin sheet metal headers it is important that the edges be reinforced around these openings. This is accomplished by inserting a reinforcing plate 13 and welding it to the margin around the opening.

The size and number of the tubes in each unit may be varied as desired. The unit con-

sisting of two vertical headers with communicating horizontal tubes may be handled separately as a complete article of commerce to be used in building up boilers of various sizes.

For such purposes the headers 1 may be horizontal and the communicating tubes 2 vertical, or these parts may be inclined. The segments which are stamped up are preferably segments of a single communicating tube with a corresponding length of header at each end, since such a shape can be most economically stamped out of rolled iron or steel or alloys thereof such as are commonly used for boilers. But it will be understood that each segment may constitute a part of two or more communicating tubes with corresponding lengths of header segments at the ends, and also, whether there be one or more segments of a communicating tube in a single stamping, the ends of the segments from which the headers are to be formed may be reduced to a single transverse segment or may be eliminated entirely, the headers being built up in other ways and being attached preferably by welding to the ends of the communicating tubes and to each other.

The preferred method of welding the parts together is the Murray method whereby the parts are pressed together edge to edge between a pair of electrodes through which is passed a current of extremely high amperage, say ninety thousand or more amperes per square inch of cross-section of the work for a very brief interval of time, say about one second or less. This produces a very quick and a very strong weld and makes it possible to build up the boiler in a series of rapid and comparatively inexpensive operations.

An improved feature is the making of the boiler from identical units, each made of two identical segments. For this reason, we can build a complete boiler practically with one set of stamping dies, whether the boiler be large or small.

Though I have described with great particularity of detail certain embodiments of my invention yet it is not to be understood therefrom that the invention is restricted to the particular embodiments disclosed. Various modifications thereof in detail and in the arrangement of the parts may be made by those skilled in the art without departure from the invention as defined in the following claims.

What I claim is—

1. A boiler including in combination a number of units each comprising a pair of headers and communicating tubes spaced apart from each other and extending between said headers; each unit being formed of a number of identical sections comprising a communicating tube with a short tubular member across each end, which tubular members are butt welded to one another end to end to form the headers; and each such section being formed of two identical segments butt welded to each other along their edges, each segment being an integral piece of sheet metal of uniform thickness, the central part of which constitutes substantially one-half of a communicating tube and the ends of which constitute halves of said short tubular members.

2. A boiler including in combination a number of units each comprising a pair of headers and communicating tubes spaced apart from each other and extending between said headers; each unit being formed of a number of identical sections comprising a communicating tube with a short tubular member across each end, which tubular members are butt welded to one another end to end to form the headers; and each such section being formed of two identical segments butt welded to each other along their edges, each segment being an integral piece of sheet metal of uniform thickness, the central part of which constitutes substantially one-half of a communicating tube divided on a vertical diametral plane and the ends of which constitute halves of said short tubular member divided on the same plane.

3. A boiler unit formed of a number of identical sections each comprising a tube communicating with a short tubular member across each of its ends, which tubular members are butt welded to one another end to end to form headers; each section being formed of two identical segments butt welded to each other along their edges, each segment being an integral piece of sheet metal of uniform thickness, the central part of which constitutes substantially one-half of a communicating tube and the ends of which constitute halves of said short tubular members.

In witness whereof, I have hereunto signed my name.

THOMAS E. MURRAY.