

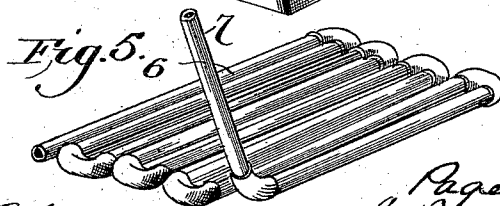
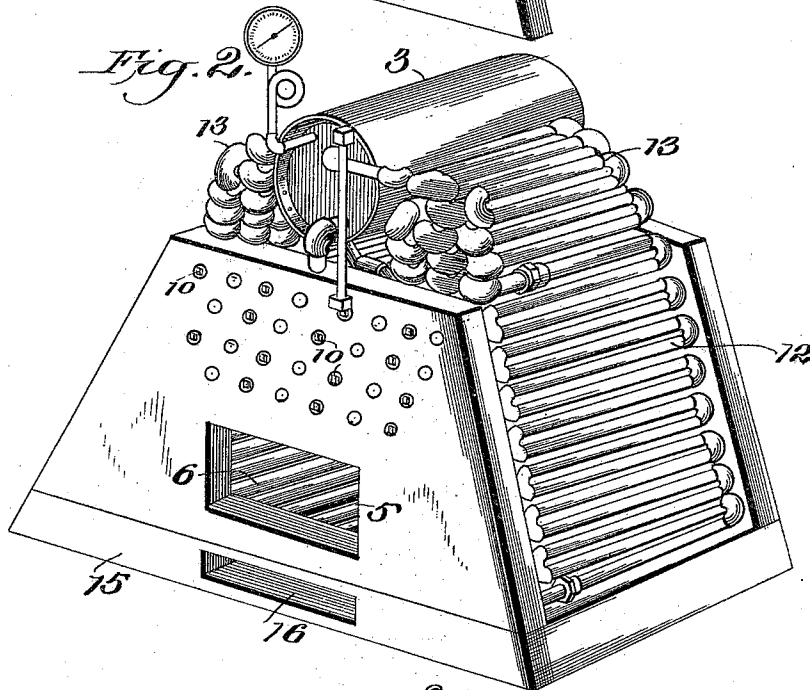
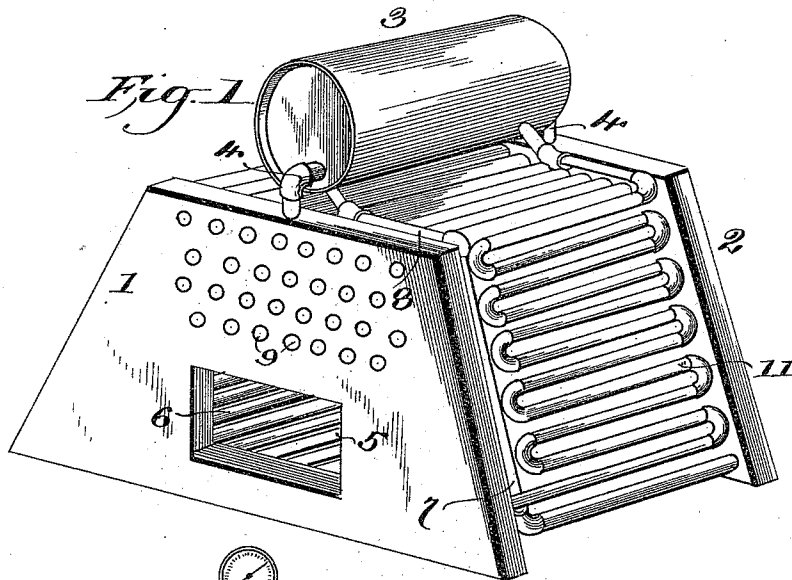
(No Model.)

2 Sheets—Sheet 1.

P. B. COLLIER & J. H. DIGNARD.
BOILER.

No. 519,241.

Patented May 1, 1894.



Witnesses
J. M. Reynolds
Chas. E. Hoyer

Inventors
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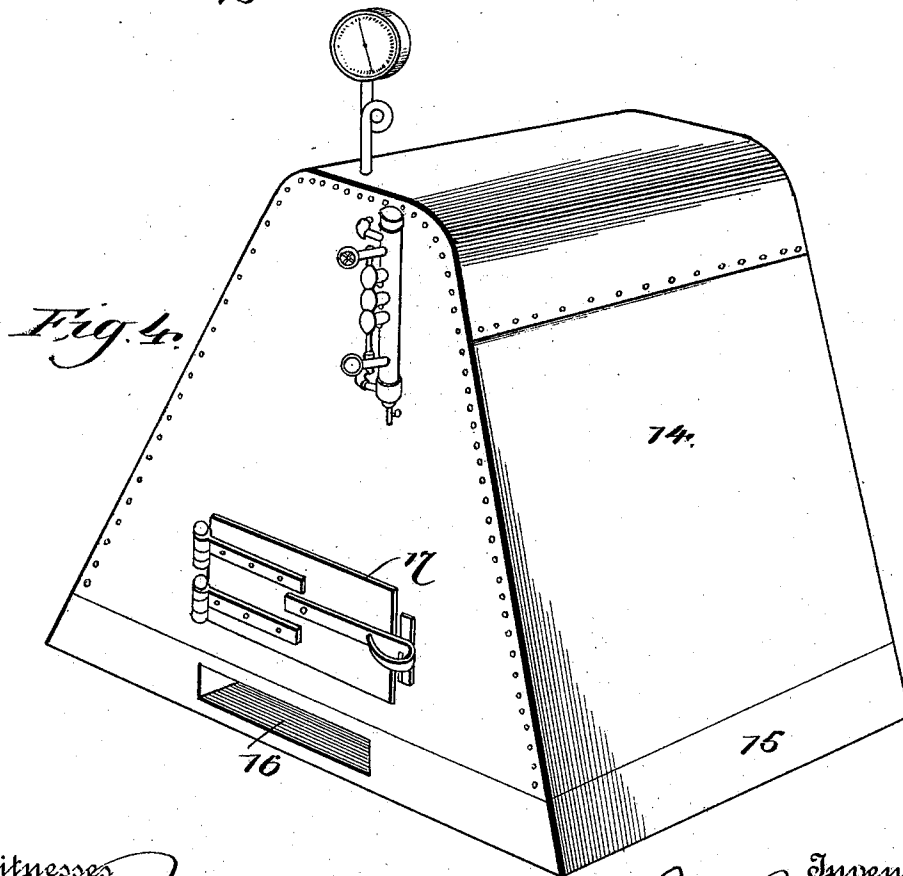
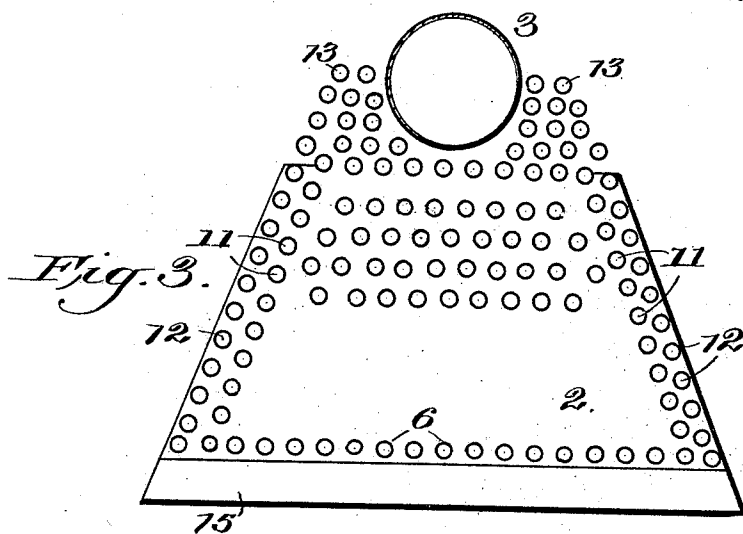
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UNITED STATES PATENT OFFICE,

PAGE B. COLLIER AND JOSEPH H. DIGNARD, OF LAKEPORT, CALIFORNIA.

BOILER.

SPECIFICATION forming part of Letters Patent No. 519,241, dated May 1, 1894.

Applicator filed December 21, 1893. Serial No. 494,312. (No model.)

To all whom it may concern:

Be it known that we, PAGE B. COLLIER and JOSEPH H. DIGNARD, citizens of the United States, and residents of Lakeport, in the county of Lake and State of California, have invented certain new and useful Improvements in Boilers; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a combined tubular and coil boiler, and has for its object to provide a compact form of boiler, which has a series of coils and pipes to expose the water to the influence of the furnace heat, the opposite ends and base of the furnace being constructed as water jackets, and thereby producing a large fire or heat exposed surface, and still preserving a reduced area of occupation.

With these and other objects in view, the invention consists of the construction and arrangement of the several parts which will be more fully hereinafter described and claimed.

In the drawings: Figure 1 is a perspective view of a boiler, embodying the invention with the outer casing removed, showing the boiler partly set up. Fig. 2 is a similar view of the boiler complete, without the outer casing. Fig. 3 is a transverse vertical section taken centrally through Fig. 2. Fig. 4 is a perspective view of the boiler with the casing thereover. Fig. 5 is a detail perspective view of one of the grate sections.

Similar numerals of reference are employed to indicate corresponding parts in the several figures.

Referring to the drawings, the numerals 1 and 2 designate front and back ends which are of hollow construction and form water receptacles or chambers, and have on the upper central portion thereof a steam dome 3 from the opposite ends of which are pipe sections or elbows 4 running to the top of each of the said ends. The front end 1 has an opening 5 therein for feeding fuel to a sectional tubular grate 6 which is formed of two or more sections of pipe in coiled form with the lower or inner ends of each section connected respectively to the said front and back ends. The outer pipe of each of the coils of the said

grate has a pipe 7 attached thereto which extends at an upward inclination closely to the front end 1, and in rear of the same and is attached by a pipe 8 to the under portion of the said steam dome 3. The ends 1 and 2 are also connected at their upper portions by longitudinally disposed tubes or flues 9 which are alternately screwed into one of the ends and swaged in the other. The swaged ends have plugs 10 screwed thereinto by small square heads as fully shown in Fig. 2. On alternate circles between the circles showing the square plugs will be the tubes screwed into the end and at the opposite ends of said tubes a similar swaged plugging connection is made as will be readily understood. It will be seen that the ends 1 and 2 form water jackets and they are all truncated in form in order to reduce the upper portions of the same and on opposite sides are located inner up-flow coils 11 which have their lower ends attached to the water jackets and their upper ends connected to the steam dome 3. These up-flow coils are placed at the same angle of inclination as the adjacent edges of the ends 1 and 2 or water jackets, and are located inward from the said edges and are brought closely in contact with the fire bed. On the said up-flow coils 11 are placed removable exterior up-flow coils 12 which are attached at their lower ends to the water jackets and at their upper ends to horizontally disposed truncated pyramidal superheating coils 13 placed on opposite sides of the steam dome. These exterior up-flow coils are made removable in order that the flues may be cleaned and after the parts are all thus arranged and exterior casing 14 is placed thereover it being seen by Fig. 2 that the ends or water jackets are mounted on a base 15 having an ash-pit 16 as fully shown. The outer casing 14 is supplied with a door 17 and proper steam and water gages as well as a blow-off will be used as may be found necessary.

The construction as set forth is exceptionally useful and convenient, in that a large amount of water heating surface as well as circulation is attained in a small space to thereby especially adapt the boiler for use on steam yachts and other analogous small ves-

sels; or for any other purpose where considerable horse power may be desired and yet condense the proportions of the boiler.

Having thus described the invention, what
5 is claimed as new is—

10 In a boiler of the character set forth the combination of opposite end water jackets with a lower tubular grate thereto and having outer ends extending upwardly, a steam dome mounted above the said water jackets and connected thereto, and also to the said
outer ends of the grate sections, tubes extending from one section to the other, inner
up-flow coils attached to the water jackets

and the steam dome, outer up-flow coils re- 15
movably placed against the inner up-flow
coils, and super-heating coils located on opposite sides of the steam dome connected to
the latter as well as to the outer removable
up-flow coils, substantially as described. 20

In testimony whereof we have signed this
specification in the presence of two subscribing witnesses.

PAGE B. COLLIER.
JOSEPH H. DIGNARD.

Witnesses:

R. L. ANDERSON,
C. R. LEE.