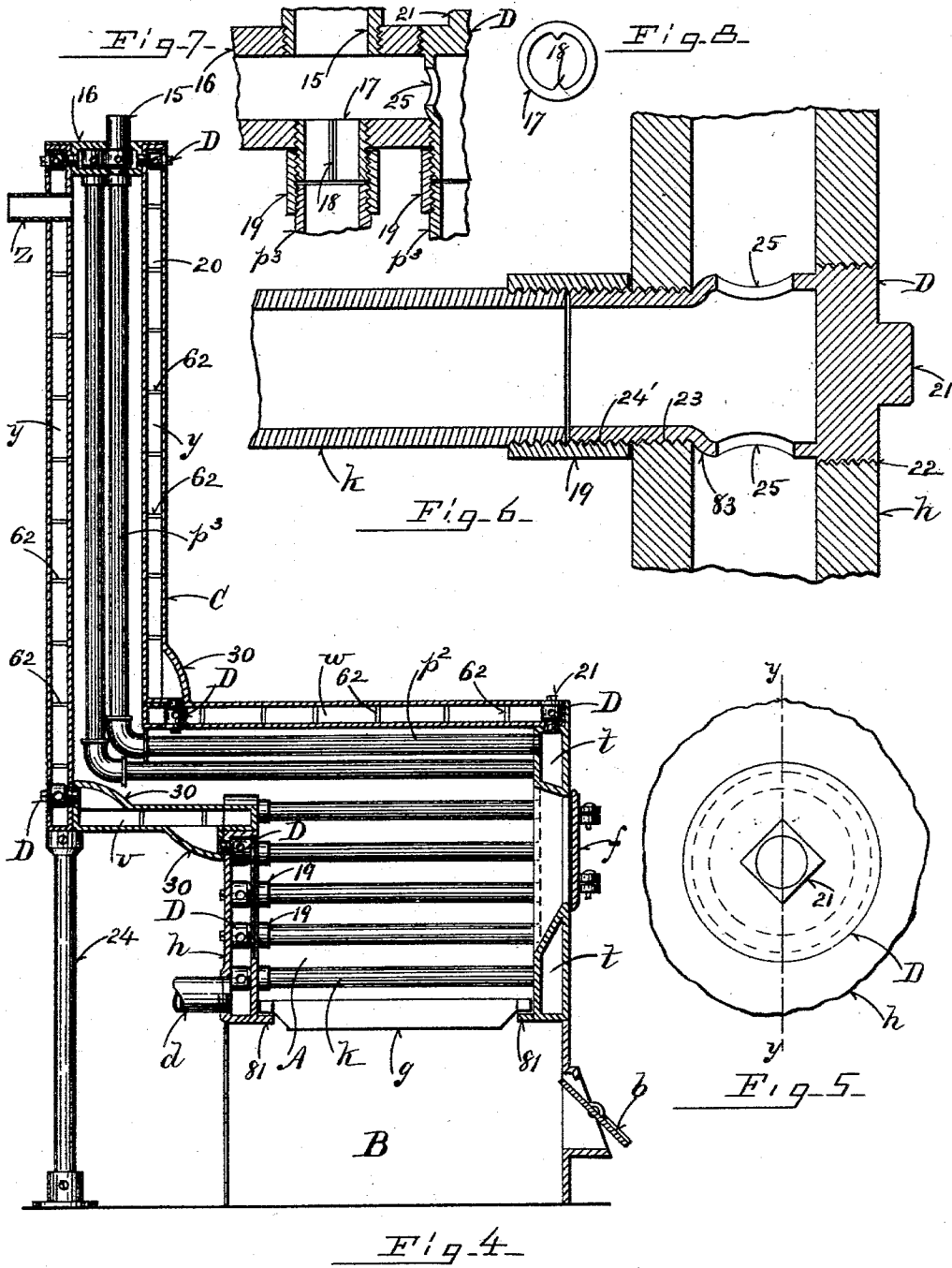


G. F. NILSSON.
STEAM BOILER.

No. 562,736.

Patented June 23, 1896.



WITNESSES=
J. D. Matthews.
C. M. Miller

INVENTOR=
George F. Nilsson
By O. M. Shaw
ATTY

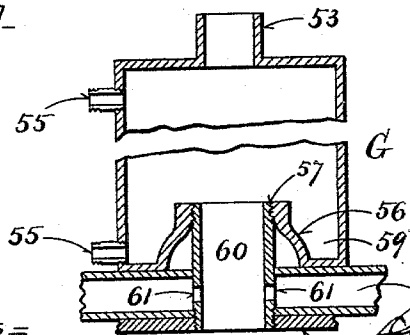
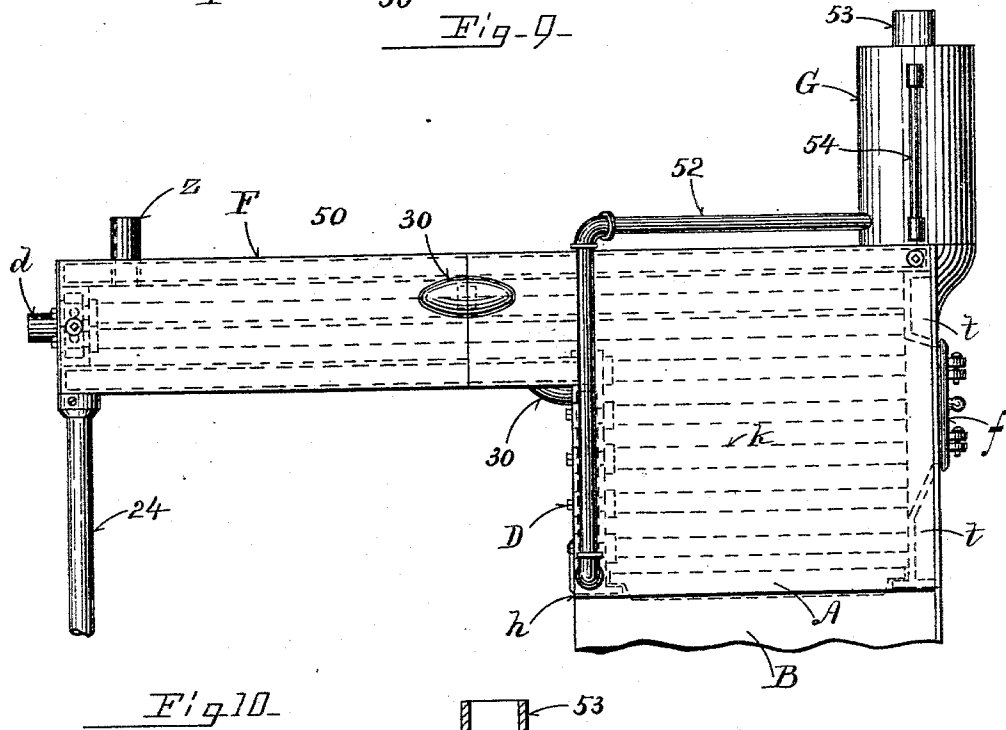
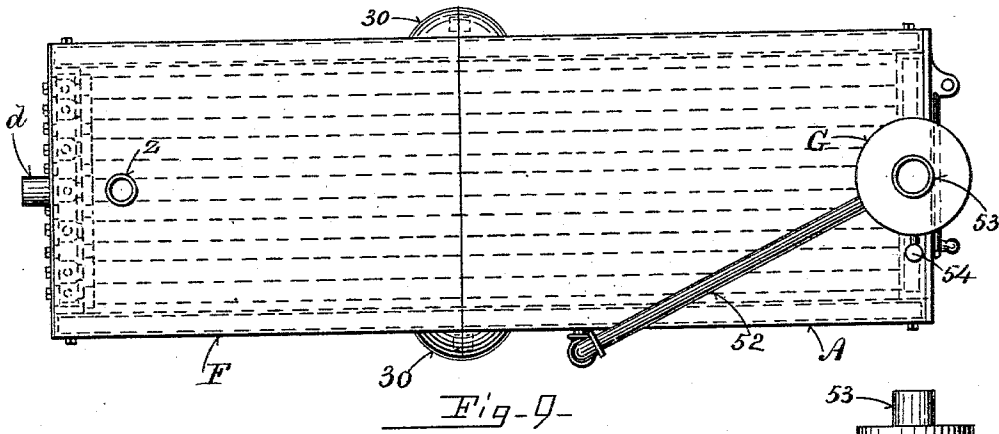
(No Model.)

3 Sheets—Sheet 3.

G. F. NILSSON.
STEAM BOILER.

No. 562,736.

Patented June 23, 1896.



WITNESSES:
J. D. Matthews,
C. M. Wilson

INVENTOR=
George F. Nilsson
By O. M. Shaw
ATTY-

UNITED STATES PATENT OFFICE.

GEORGE F. NILSSON, OF WHITINSVILLE, MASSACHUSETTS.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 562,736, dated June 23, 1896.

Application filed October 7, 1895. Serial No. 564,942. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. NILSSON, of Whitinsville, in the county of Worcester, State of Massachusetts, have made certain new and useful Improvements in Steam-Boilers, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a front elevation of my improved boiler; Fig. 2, a side elevation of the same; Fig. 3, a vertical transverse section taken on line *x x* in Fig. 2; Fig. 4, a vertical longitudinal section of the boiler; Fig. 5, an elevation showing the outer end of one of the couplings, the body of the boiler being broken off; Fig. 6, a vertical section on line *y y* in Fig. 5; Fig. 7, a sectional view, and Fig. 8 a plan view, showing a form of coupling adapted for use at the top of the boiler; Fig. 9, a top plan view of my improved boiler in horizontal form; Fig. 10, a side elevation of the same; and Fig. 11, a vertical section of the steam-dome, showing the method of attaching.

Like letters and numerals of reference indicate corresponding parts in the different figures of the drawings.

My invention relates to improvements in boilers particularly adapted for use in hot-water and steam heating and is an additional invention relating to the boiler shown in my United States Letters Patent No. 517,147, dated March 27, 1894.

The especial object of this invention is to obtain the maximum amount of steam for the quantity of fuel consumed and to lessen the cost of construction, the peculiarities of which admit of the entire casing being cast.

In carrying out my improvements I make use of means which will be readily understood by all conversant with such matters from the following explanation.

In the drawings, A represents the fire-box, and B the ash-pit. The box is rectangular, preferably, and is provided with a water-jacket *t* at the front. The door *f* opens through the water-jacket. On said jacket there are lugs 81, upon which the grate *g* is

supported. The door *b* of the ash-pit is pivoted to swing vertically. At the rear of the fire-box a jacket *h* is vertically arranged. The shape of this jacket is best shown in Fig. 3, its inner wall being cut away to form the space *i*. A series of horizontal circulation-pipes *k* connect the jackets *h t*. These pipes have one end threaded and turned into the inner wall of the jacket *t* before the jacket *h* is adjusted. Onto the opposite end of the pipe an ordinary coupling-ring 19 is turned. The walls of the jacket *h* are tapped at 23, to coincide with the threads 24' of the ring 19. (See Fig. 6.) The coupling-heads D for securing the other ends of the pipes to the jackets are a salient feature of my invention. The opening 22 is of greater diameter than the opening 23. Said coupling D has a threaded shank, which will pass readily through the opening 22 and turn into the opening 23 in the inner wall of the jacket and into the coupling-ring 19. At the inner end of said shank there is a shoulder 83, which engages said inner wall. The head of the coupling D is solid and threaded to fit the opening 22 in the outer wall of the jacket. Said head has a squared projection 21 to receive a wrench. Ports 25 in the coupling open into the jacket and permit flow therefrom to the pipes *k*. By this means the jackets and pipes are firmly secured together.

The sides of the box comprise jackets *q*, of cast metal, the walls of which are connected by braces 62. (See Fig. 3.) A similar horizontally-arranged jacket *w* forms the top and are all connected together by couplings D, as shown in Figs. 2 and 4. The inlet *d* enters the rear jacket *h*. A short horizontal jacket *v* overlaps the top of said rear jacket, its outer end being supported by a post 24. This jacket has hollow oval projections 30, into a wall of which the connecting-coupling D is turned and through which the circulation takes place.

The vertical portion C of the boiler forms the flue and is constructed of jackets *y*, of the form described, which are respectively secured together. These jackets have their walls connected by braces 62, cast integral therewith, as described for the other jackets.

The rear vertical jacket *y* rests on the post 24, and is connected to the jacket *v* by coup-

ling D and hollow projection 30. The front jacket *y* is connected in like manner with the jacket *w*. Each side jacket has a door *r*, through which the flue may be cleaned. The nipple *z* for the funnel opens into the top of the flue. The top of the flue C is closed by a jacket 16, connected in the same manner as the others. A series of pipes *p*² are arranged horizontally over the fire-box, one end of said pipes being turned into the wall of the jacket *t*. Ordinary elbow-couplings are turned onto the inner ends of these pipes, and vertical pipes *p*³, secured therein, pass through the flue C and connect with the jacket 16, either by coupling D or the form 17. (Shown in Figs. 7 and 8.) The hot water is taken from the jacket 16 by nipples 15, each of said nipples registering with one of the flue-pipes. For such it is impracticable to use the coupling D, so I employ with the ring 19 a coupling-tube 17, exteriorly threaded to turn into the inner wall of said jacket and into said ring. This tube has inwardly-projecting flanges 18 to receive a tool for rotating the tube.

The fire from the grate contacts directly with the pipes in the box and flue and also with the jackets, affording a far greater heating-surface than is usual in boilers of this size. This enables me to employ a very small amount of water, only enough to protect the heating-surfaces being necessary. By my peculiar arrangement for connecting the parts I am enabled to greatly reduce the cost of construction, as all the jackets can be cast whole and easily connected by the couplings described. These couplings effect great saving of time in assembling the parts, as all the difficulties incident to the use of "right and left" couplings are avoided.

If preferred, the vertical jackets *y* may be dispensed with and the flue formed of brick, the action of the boiler being substantially as good.

When used for steam, I preferably employ the form shown in Figs. 9, 10, and 11. The vertical flue C is substituted by a horizontal one F, supported by a leg 24, and into which the inlet *d* enters. The connections are made in the same manner as before.

A steam-dome G is mounted on the top of the main body of the boiler and is connected with the jackets *w t* by a special coupling 60. This coupling comprises a tube threaded to enter the walls of said jackets and having ports 61, opening into the jacket *w*. Said coupling is extended into the interior of the dome, the bottom of which is tapped and threaded at 57 to receive the coupling. Said bottom is concaved at 56, forming an annular space 59 in the bottom of the dome. The dome has nipples 55 at top and bottom and the gage-glass 54 is connected therewith. By opening the connection 60 above the bottom of the dome and forming the space 59 the condensation is quiet and there will be no circulation through the glass. Steam is taken from

the top of the dome and there is a nipple 53 for attaching a pipe.

The operation of the boiler is substantially the same as for the hot-water form described. A circulation-pipe 52 connects the bottom of the dome with the bottom of the rear jacket *h*. The rear section F of this form may be omitted if desired and the jacket *h* extended to form the rear wall of the boiler.

Having thus explained my invention, what I claim is—

1. In a boiler a jacket as, *h*, having screw-threaded openings in its walls in alinement, the opening in the outer wall being of greater diameter than that in the inner wall, in combination with a coupling, D, having a threaded shank fitted to pass freely through the outer opening and be turned into the inner opening and a threaded head fitted to turn into and close the outer opening, said coupling having a port opening into said jacket substantially as described.

2. In a boiler the coupling, D, having ports, shoulder, 83, and threaded portions, 22, and, 23, of different diameters substantially as and for the purpose specified.

3. In a boiler a fire-pot; water-jackets surrounding said pot, said jackets being cast integral; and screw-couplings connecting said jackets said couplings being exteriorly screw-threaded at both ends, the outer end being of greater diameter whereby they are adapted to be applied through the outer wall of the jackets and permit circulation therethrough substantially as specified.

4. In a boiler the jackets, *h, t*, in combination with the pipes, *k*, having an end turned into one of said jackets their opposite ends being connected with the opposite jacket by a coupling-ring, 19, and coupling, D, having the threaded portions of different diameters substantially as set forth.

5. In a boiler the jacket, 16, having nipple, 15, in combination with the pipe, *p*³, the ring, 19, and the coupling-tube, 17, turned into said ring and jacket all being arranged to operate substantially as set forth.

6. In a boiler the dome, G, having the bottom, 56, forming the space, 59, the jacket, *w*, and the coupling 60, all being combined and arranged to operate as set forth.

7. In a boiler a jacket as, *v*, provided with a hollow projection, 30, fitted to receive a coupling, D, whereby it may be connected to a similar jacket substantially as and for the purpose set forth.

8. In a boiler the dome, G, having the bottom, 56, forming space, 57, in combination with a water-jacket connected with the boiler-flow and a coupling tapping said jacket and said bottom centrally substantially as shown and described.

GEORGE F. NILSSON.

Witnesses:

O. M. SHAW,
C. M. WILBUR.