5 Sheets Sheet. 1.

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Sectional Boiler.

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Figure No 3.

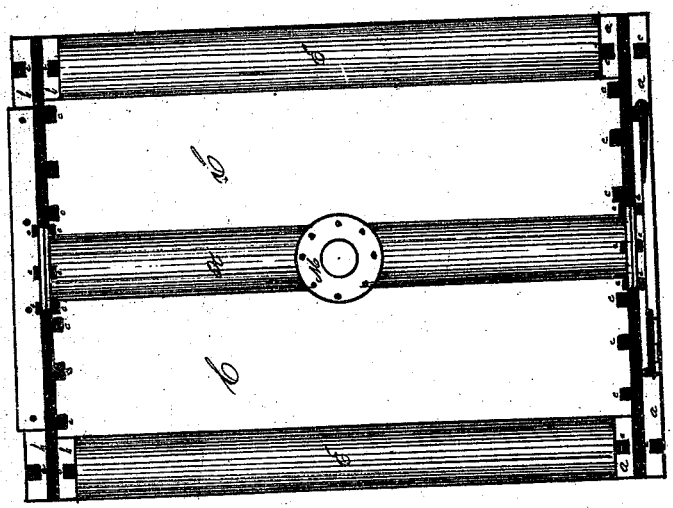

Figure No 2

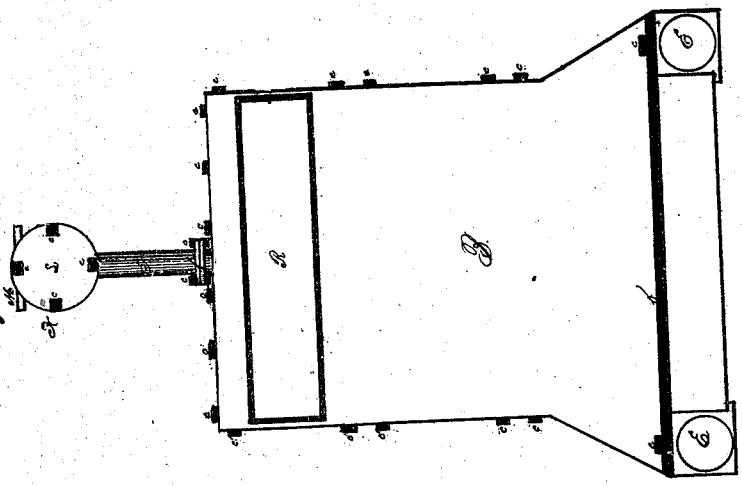

Figure No 1

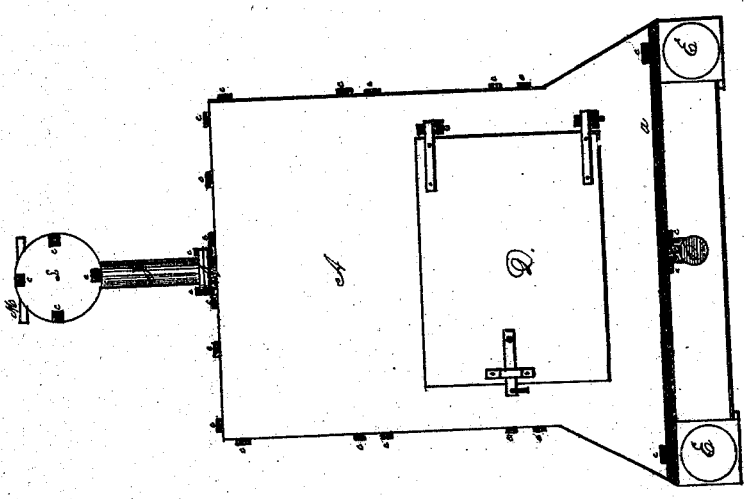

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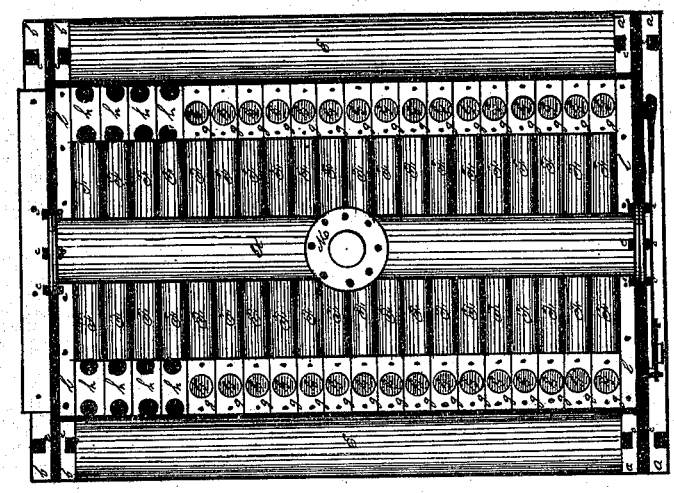
Figure No 6



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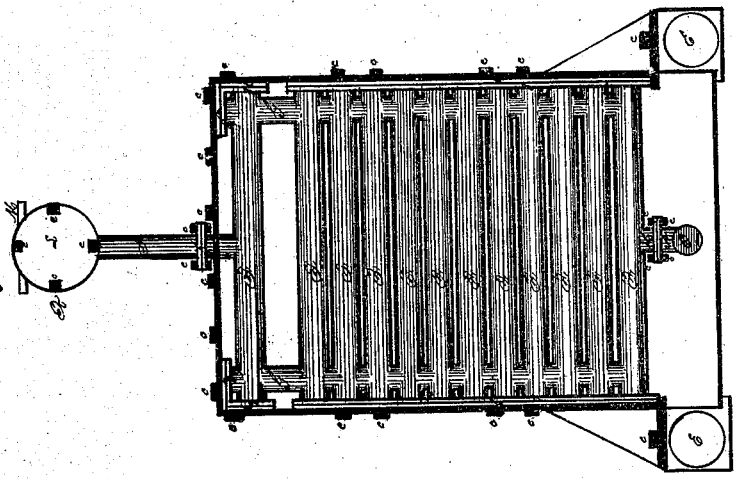

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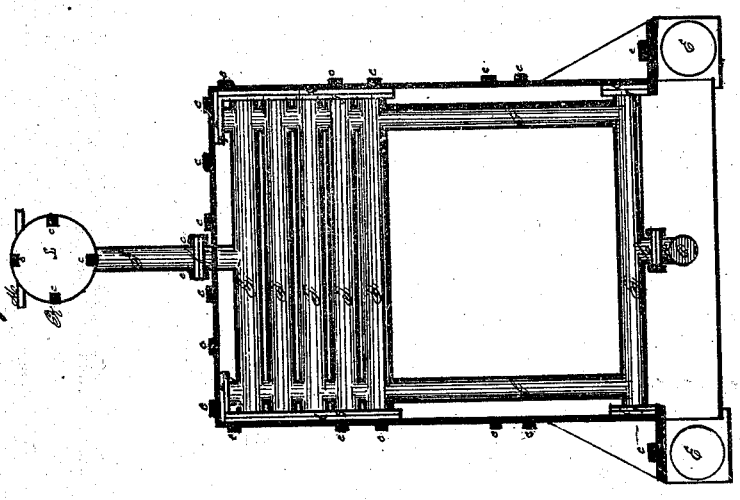

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Figure No 8

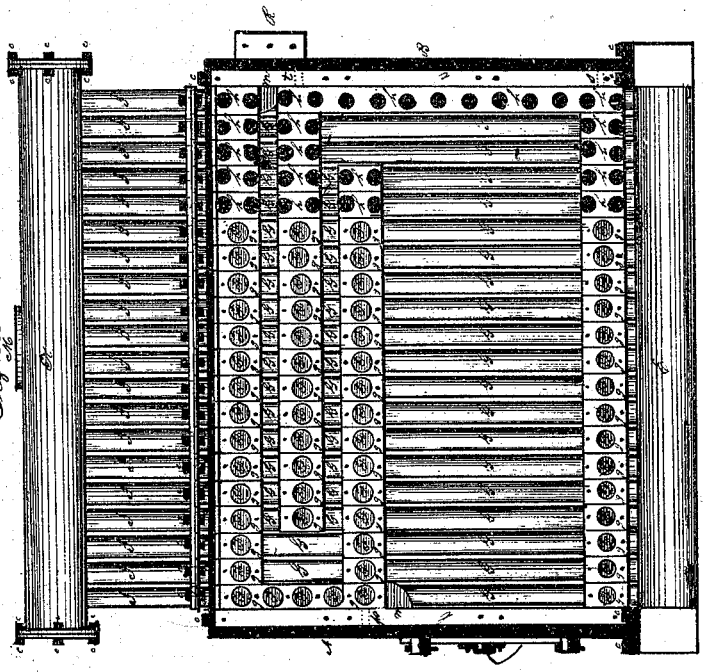
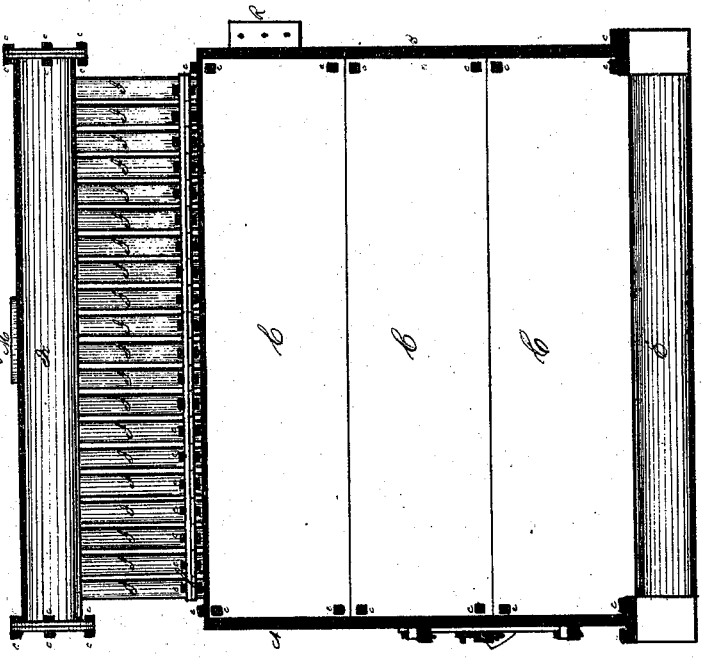


Figure No 7



Witnesses
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Figure No 10

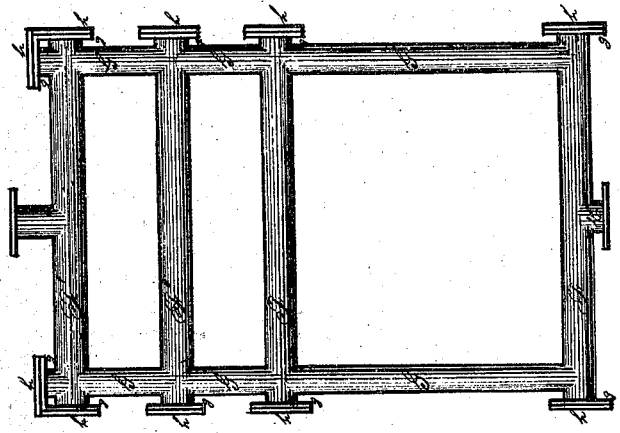

Figure No 9

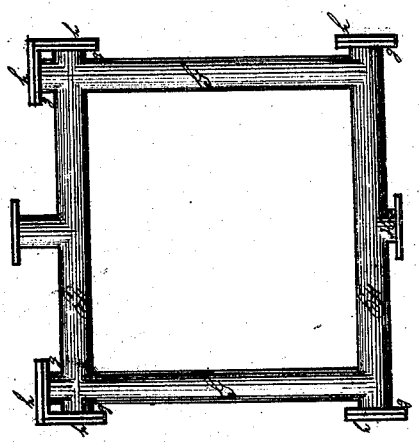

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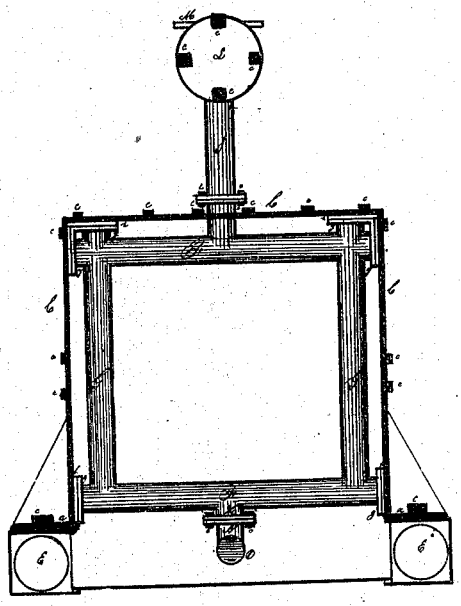
Figure No 11



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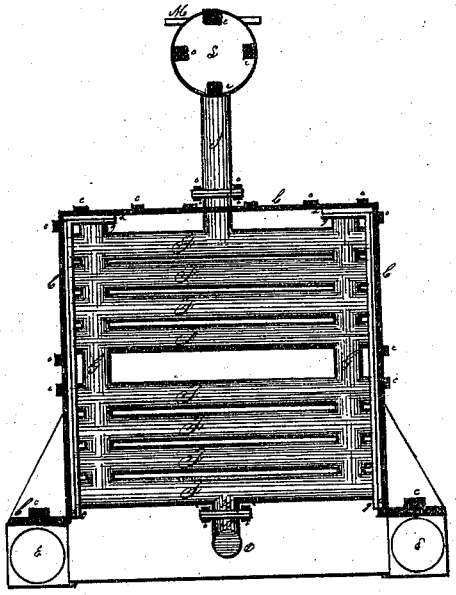
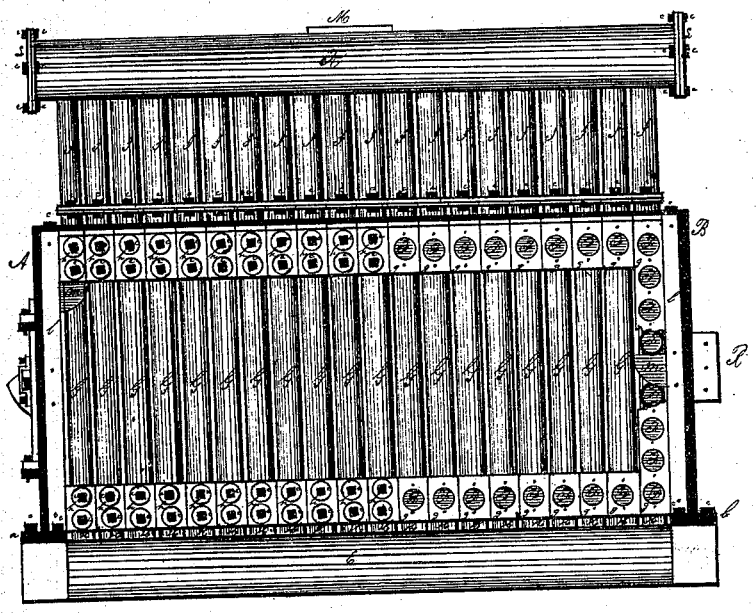


Figure No 13



United States Patent Office.

WILLIAM WESTON, WILLIAM R. WESTON, NATHANIEL WESTON, AND BURT BRETT, OF STEVENS' POINT, WISCONSIN.

Letters Patent No. 107,840, dated September 27, 1870.

IMPROVEMENT IN STEAM-GENERATORS.

The Schedule referred to in these Letters Patent and making part of the same.

We, WILLIAM WESTON, WILLIAM R. WESTON, NATHANIEL WESTON, and BURT BRETT, of the city of Stevens' Point, county of Portage, State of Wisconsin, have invented certain Improvements in Steam-Boilers, of which the following is a specification.

The first part of our invention relates to improvements in the construction, combination, and connections of the tubular parts of steam-boilers, constituted of tubes of small diameter, for holding water and generating steam, the improvements consisting of improved forms, combinations, and connections of the sections of the boiler, formed principally of horizontal parts, connected by vertical parts, the sections so combined and connected as to form a fire-box for the combustion of the fuel, and a simple form of boiler, having only one combustion-chamber, the forms, combinations, and connections of the sections being such as to be sufficient for the purposes of the fire-box without the addition of any inclosure, other than the frame and plates hereinafter mentioned.

The second part of our invention relates to a variation of the form of the boiler from the simple form above described, by the addition of one or more series of horizontal tubes, and an extension of the vertical tubes, forming combustion-chambers or a serpentine flue, for the purpose of retaining the heat.

The objects of the first and second parts of our invention are to secure safety from explosion, economy of fuel and space, and forms of boiler adapted to portable purposes.

The third part of our invention relates to an inclosure of the tubular parts of the boiler.

This inclosure consists of the combination of the tubular beams with the front and rear plates, by the flanges at the base of the plates forming a substantial frame, together with the use of plates, attached by bolts and flanges, on the sides and tops of the front and rear plates, in the manner hereinafter described, all constructed of iron, or other metal, forming a strong and symmetrical inclosure, with comparative lightness, for the purposes of supporting the tubular parts and keeping them firmly in place, preventing the loss of heat by radiation, as well as confining the heated air of the fire-box, affording easy access to the tubular parts of the boiler, for cleaning and other purposes, and avoiding the use of cumbrous inclosures.

Description of the Accompanying Drawing.

Figure No. 1 represents a front view of the boiler.

Figure No. 2 represents a rear view of the boiler.

Figure No. 3 represents the top of the boiler.

Figure No. 4 represents the tubular parts of the boiler in front.

Figure No. 5 represents the tubular parts of the boiler in rear.

Figure No. 6 represents the tubular parts of the boiler on the top.

Figure No. 7 represents the left side of the boiler.

Figure No. 8 represents the tubular parts of the boiler on the left side.

The preceding drawing relates to a form of the boiler combining a series of combustion-chambers with the fire-box.

Figure No. 9 represents an intermediate section, in a simple form of the boiler, having only one combustion-chamber, as indicated in figs. Nos. 11, 12, and 13.

Figure No. 10 represents an intermediate section in a modified form of the boiler, having one or more series of horizontal parts, F' F', added, for the purpose of forming combustion-chambers in combination with the fire-box, as indicated in fig. No. 8.

Figure No. 11 represents a section of the boiler in front, in a simple form, having only one combustion-chamber.

Figure No. 12 represents a section of the same boiler in rear.

Figure No. 13 represents the tubular parts of the same on the left side.

A is the front plate of the inclosure.

B is the rear plate.

C C are the plates on the sides and top of the inclosure.

D is the door of the furnace.

E E are the tubular beams at the base of the inclosure for the support of the front and rear plates, tubular in form, for the purpose of combining strength and lightness, and with the front and rear plates constituting the frame of the inclosure.

F F are the horizontal parts, and

G G the vertical parts of the tubes, for holding water and generating steam, forming the principal parts of the fire-box for the combustion of the fuel, and constituting the boiler in a simple form, having only one combustion-chamber, as shown in figs. Nos. 11, 12, and 13.

Additional tubes, F' F', may be inserted in some of the intermediate sections, as well as the front and rear sections of tubes, to vary the form of the boiler, one of the variations being shown in figs. 8 and 10, forming, in combination with the fire-box above described, one or more series of horizontal tubes, F' F', and forming combustion-chambers or a serpentine flue, as shown in fig. 8.

About two-thirds of the lower row of the horizontal parts F, next to the front plate, are a little smaller than the remainder of the parts of the same row next to the rear plate, for the purpose of admitting a supply of air from beneath the furnace.

The vertical parts G G are smaller than the horizontal parts F F and F' F', in fig. 8, for the purpose of permitting the heated air of the furnace to flow

around the vertical parts and heat them on all sides, without permitting so much of the radiating heat of the fire-box to pass through among the vertical tubes as to injure the side plates of the inclosure.

The tubes F F and F′ F′, in the front and rear sections of tubes, are a little separated from each other in their respective sections, for the purpose of allowing a free circulation of heated air around the tubes, without permitting so much radiating heat from the fire-box to reach the front and rear plates as to injure them.

H H are short vertical branches of the lower horizontal tubes F F, with flanges, for the purpose of connecting the tubular sections by the lower transverse tube O.

N N are vertical branches of the transverse tube O, with a continuous flange, for the purpose of connecting the tubular sections and admitting supply water.

K is the upper transverse tube, for receiving and holding steam, with vertical branches, I I, and a continuous flange, *f*, for the purposes of connecting the tubular sections at the top, and binding them firmly together, and conducting the steam into the upper transverse tube.

L is the cap of the upper transverse tube K.

M is a flange on the top of the tube K, for attaching a steam dome and other usual attachments for receiving, regulating, and transmitting steam from the boiler.

R is the flange on the rear plate, for connecting the chimney of the furnace.

a a are the flanges at the base of the front plate A.

b b are the flanges at the base of the rear plate B, for the purpose of attaching the front and rear plates to the tubular beams at the base of the inclosure.

c c are the bolts for fastening the parts of the boiler above described together.

g g are the flanges at the ends of the horizontal parts F F and F′ F′ and the tops of the vertical parts G G of the tubes.

h h are the caps for closing the ends and tops of the horizontal and vertical parts of the tubes, the caps being fastened with bolts and countersunk, makthe heads of the bolts even with the faces of the caps, (omitted in figs. Nos. 6 and 8, in parts of each figure, to show the forms of the tubes and flanges.)

l l are flanges on the front and rear plates, for the purpose of attaching the side and top plates.

m m are lugs on the inside of the front and rear plates, for the support of the tubular parts of the boiler.

p is a flange on the inner side of the front plate, opposite the row of tubes F F on the upper side of the fire-box, in fig. 8, to conduct the heated air through the chambers of the furnace or flue.

s and *t* are flanges, similar to those last named, on the inner side of the rear plates, opposite the lower row of tubes F F, and opposite the row of tubes F′ F′, next below the chimney, in fig. 8, extending along the whole length of the tubes, for the purpose of conducting the smoke and heated air through the chambers of the furnace.

What we claim as our invention, and desire to secure by Letters Patent, is as follows:

1. In combination, the horizontal tubes F and vertical tubes G, surrounding the fire-box, and disposed in front, rear, and intervening sections, substantially as described.

2. In combination with the foregoing, one or more series of horizontal tubes F′, forming combustion-chambers or a serpentine flue, substantially as described.

3. In combination with the foregoing, the metallic inclosure, constructed substantially as and for the purpose set forth.

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