

No. 771,290.

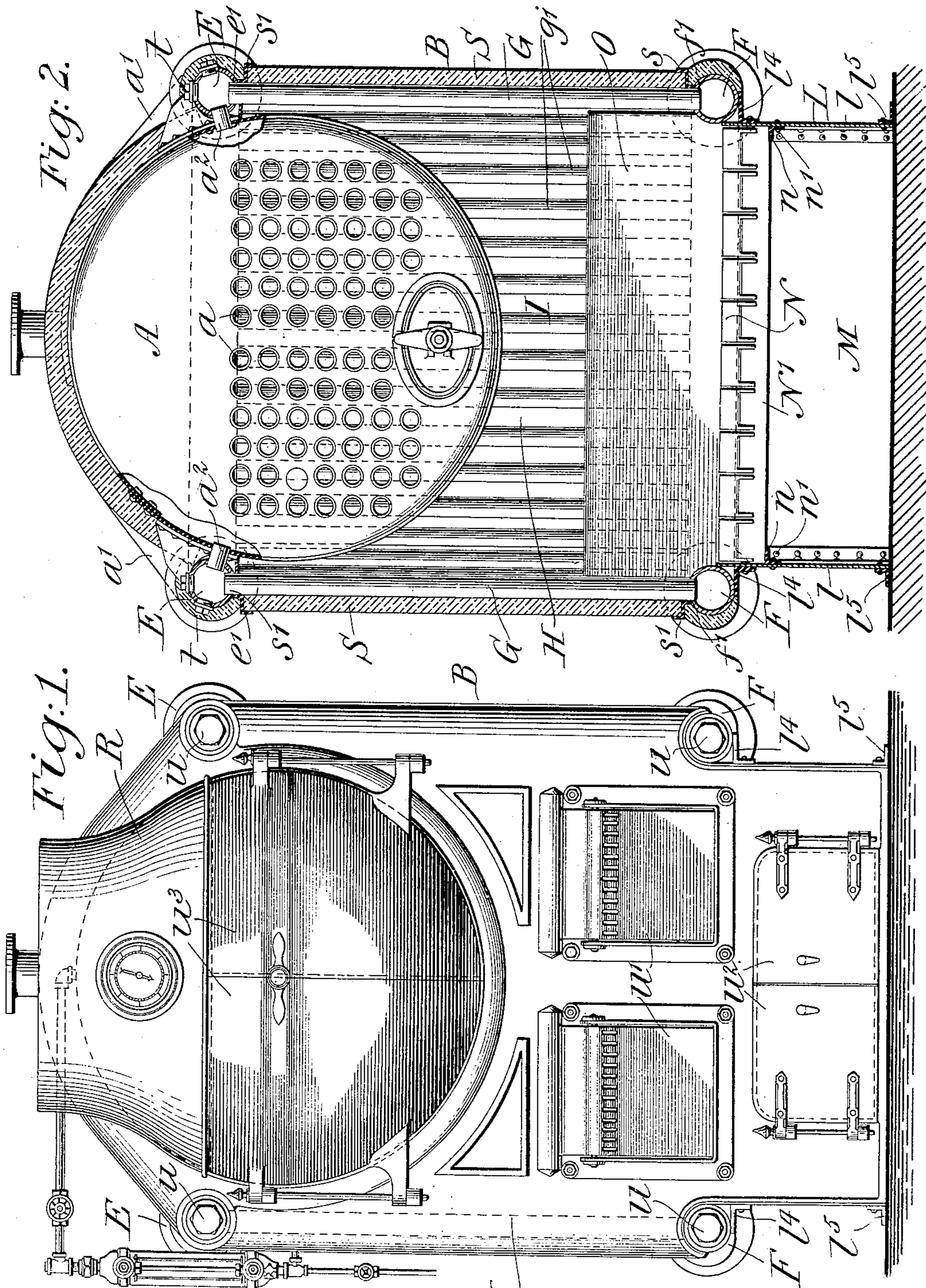
PATENTED OCT. 4, 1904.

A. WORTHINGTON.  
SETTING FOR BOILERS.

APPLICATION FILED NOV. 22, 1902.

NO MODEL.

5 SHEETS—SHEET 1.



Witnesses  
*John A. Rennie.*  
*R. F. Green.*

Inventor  
*Amasa Worthington,*  
By his Attorney  
*Wm. S. Appleton.*

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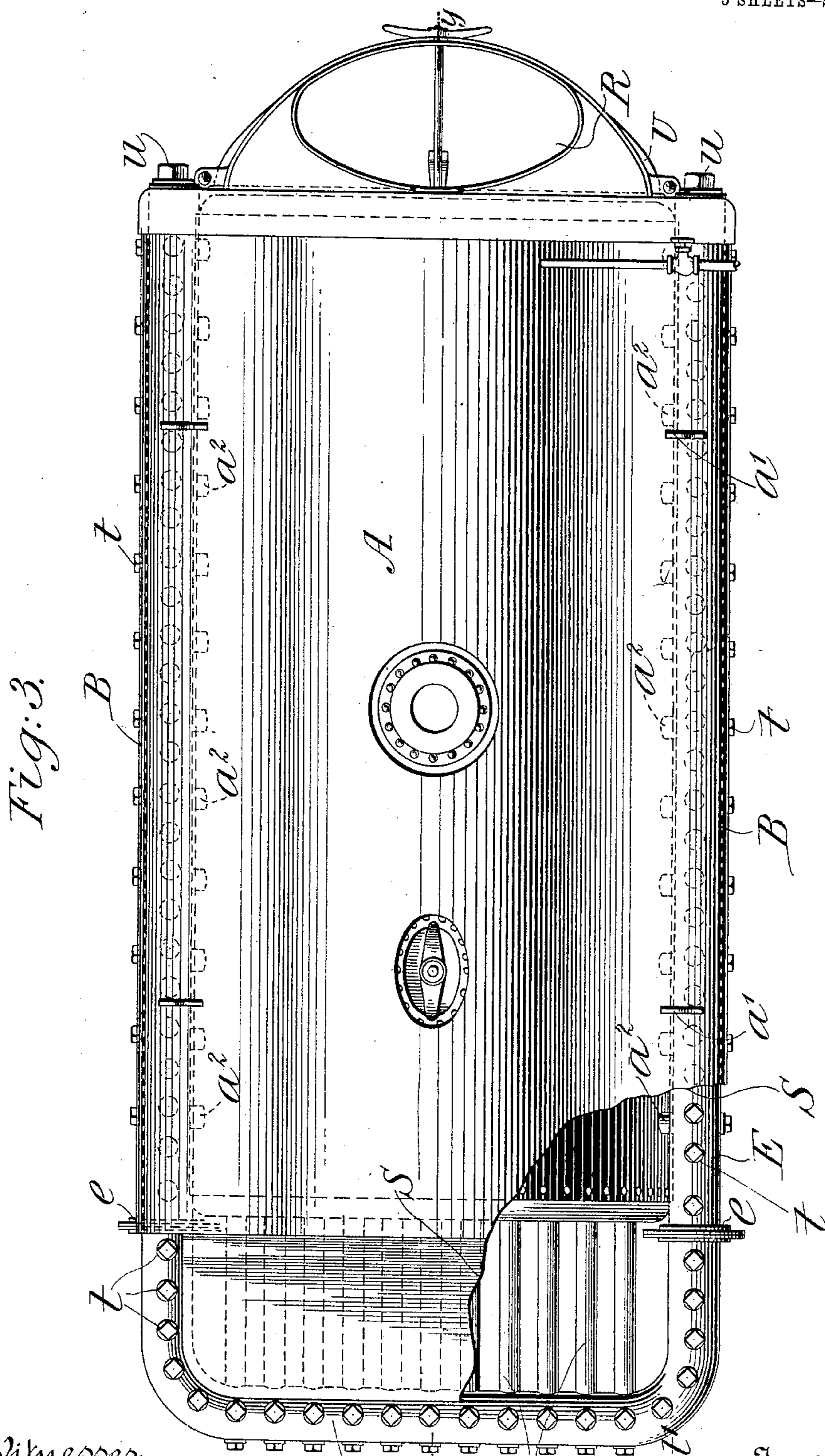


Fig. 3.

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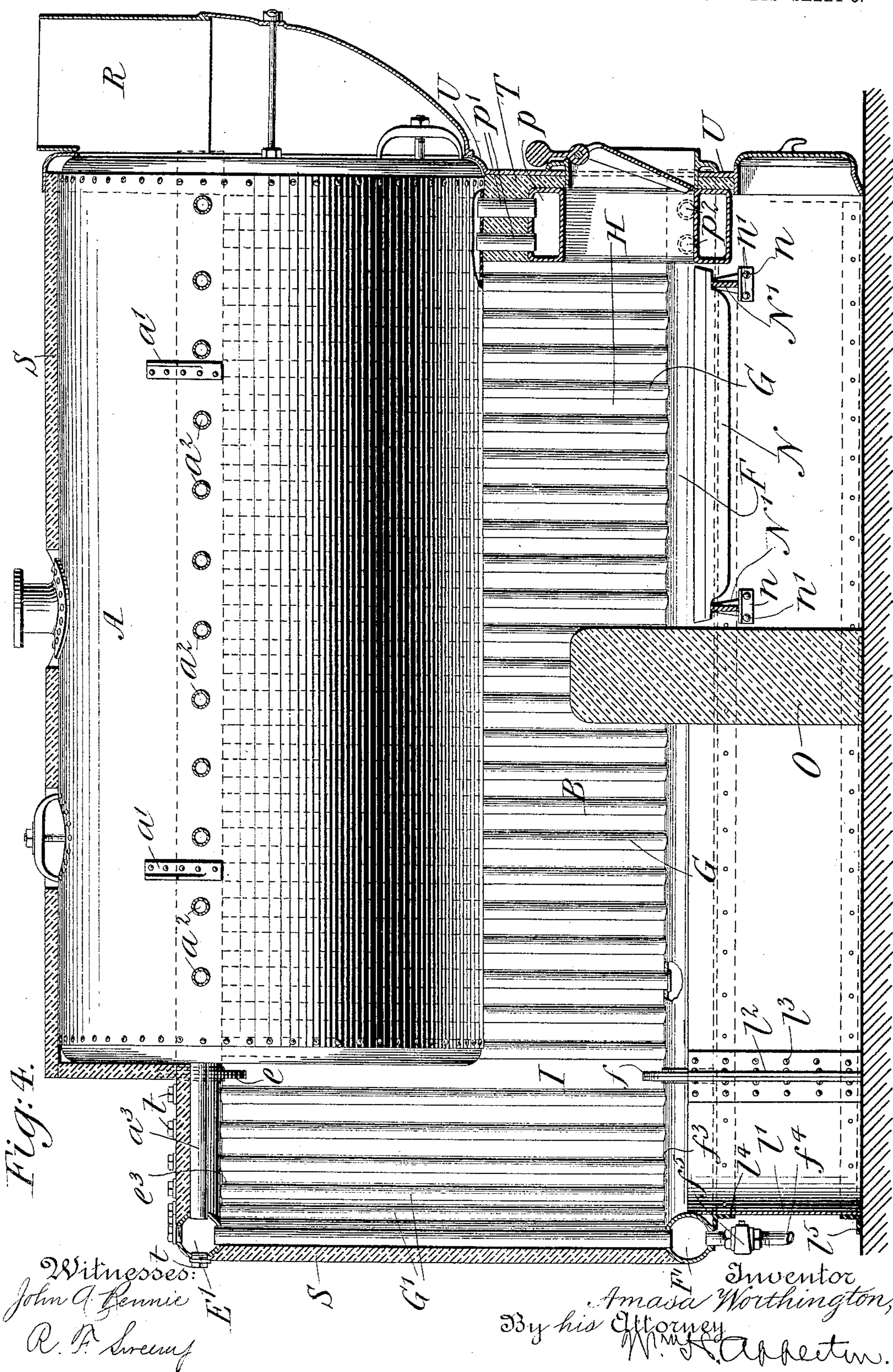
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5 SHEETS—SHEET 3.



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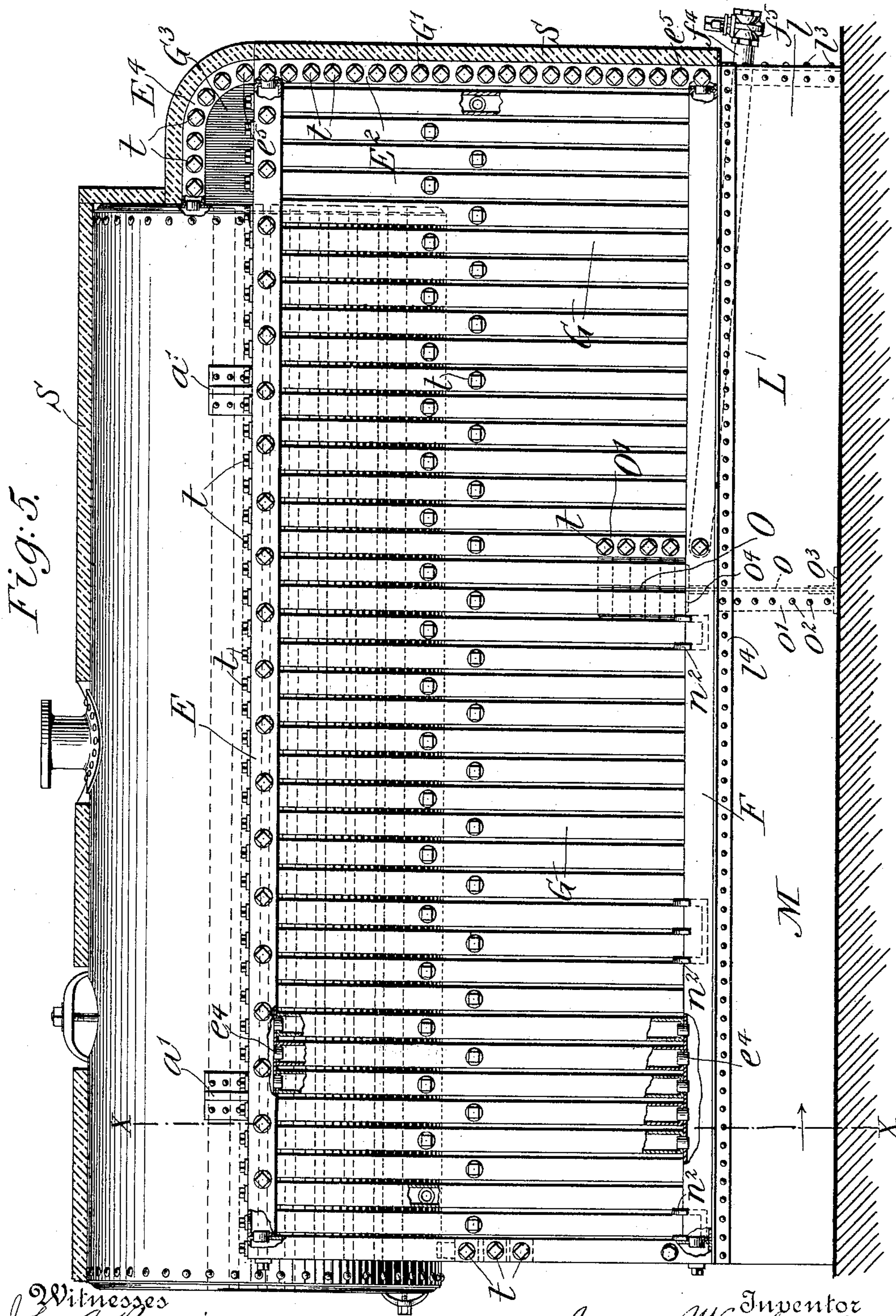
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NO MODEL.

5 SHEETS—SHEET 4.



Witnesses  
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# UNITED STATES PATENT OFFICE.

AMASA WORTHINGTON, OF NEW YORK, N. Y.

## SETTING FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 771,290, dated October 4, 1904.

Application filed November 22, 1902. Serial No. 132,356. (No model.)

*To all whom it may concern:*

Be it known that I, AMASA WORTHINGTON, a citizen of the United States, and a resident of the borough of Brooklyn, in the city of New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Settings for Boilers, of which the following is a specification.

My invention, while applicable to boilers of the different classes and forms generally, is here shown applied in connection with an ordinary tubular-shell boiler of the return-flue type, its object being to provide a setting for boilers which while simple in construction and capable of ready application shall at the same time permit of the utilization of the radiated and other heat usually absorbed by the setting in heating the water or other contents of the boiler.

To these ends the invention consists, first, in the construction of the walls of the setting from tubular members through which the water and steam contained in the boiler circulates, and, second, in various arrangements and combinations of the parts composing the setting, all as will hereinafter more fully appear.

Referring to the accompanying drawings, which form a part of this specification, Figure 1 is a front elevation of an ordinary cylindrical boiler with my invention applied in connection therewith; Fig. 2, a transverse section of the setting for the boiler, taken in the plane  $x x$  of Fig. 5, showing also the boiler in front elevation with parts broken away for convenience of illustration; Fig. 3, a plan of a boiler and a setting therefor constructed in accordance with my invention, part of the covering of the setting being broken away for purposes of illustration; Fig. 4, a longitudinal vertical sectional elevation of such setting, taken in the plane  $y y$  of Fig. 3, showing in addition a boiler in side elevation with parts of the boiler and setting broken away; Fig. 5, a side elevation of a boiler and a setting therefor of a slightly-modified construction, the covering for the boiler and setting being taken in section in the line  $y y$  of Fig. 3, with parts of the boiler and setting broken away for purposes of illustration; Fig. 6, a front elevation

of the boiler and setting shown in Fig. 5, with the covering removed and parts of the setting broken away; Fig. 7, a detail, partly in elevation and partly in section, of a further modified construction of setting, showing also a section of its covering; Fig. 8, a horizontal section of the same, taken in the plane of  $z z$  in Fig. 7; and Fig. 9, a detail front elevation, on a reduced scale, of one of the stoke-holes.

In all the figures like letters of reference are employed to designate corresponding parts.

A indicates a boiler which may be of any ordinary or preferred construction; but, as shown in the drawings, it is of the usual cylindrical form and is provided with a series of return tubular flues  $a$ , which extend longitudinally through the same from one end thereof to the other, as is common to boilers of this class as heretofore constructed.

B indicates the setting in which the boiler is arranged and supported. This setting instead of being formed from brick or other similar material, as heretofore, is constructed of tubular members which are so disposed and connected as to not only afford a firm support for the boiler, but permit of the circulation of the water and other contents of the boiler therethrough when the boiler is in operation, and vice versa. To this end the horizontally-disposed drums E are made use of, one of which is arranged on each side of the boiler in close relationship thereto, and with each of these drums a second drum F is employed, which is disposed at the proper distance below the former and is connected with it by a series or row of vertical tubes G, extending between them and placed in such relationship to each other as to form a continuous and unbroken wall throughout. In some instances the rear ends of the upper drums E and the rear ends of the lower drums F will be respectively connected by U-shaped pipes E' and F', which extending outward rearwardly and across from one to the other are joined at their opposite ends to the ends of their respective drums by appropriate connections—as shown, for instance, at  $e$  and  $f$  in Figs. 3 and 4—and in these cases the upper connecting-pipe E' will be connected with the lower connecting-pipe F' by vertical tubes G', which,

with the tubes G, will form a continuous and unbroken series along the sides of the setting and across the back thereof. In other instances the rear ends of these drums E and F will extend rearwardly and be respectively connected with vertical pipes E<sup>2</sup> and E<sup>3</sup>, the rear ends of the drums E and F on one side of the setting being connected with the pipe E<sup>2</sup>, while the rear ends of those on the opposite side are connected with the pipe E<sup>3</sup>, and when this form of construction is employed the pipes E<sup>2</sup> and E<sup>3</sup> will be connected in a similar manner by a series of horizontal tubes G', extending across from one to the other and in a continuous series from their bottom to their tops, as shown in Fig. 5. With the first of these constructions the drums, pipes, and tubes are shown as constructed in circular form in cross-section, while in the other they are shown as constructed in rectangular form; but this is unessential, and the drums, pipes, and tubes of either form may be employed in connection with either of the arrangements, as preferred, and the setting operate with equal efficiency.

When the drums and tubes of a circular cross-section are employed, the securing of the opposite ends of the tubes G to the drums E and F will be effected by expanding them in suitable orifices e' and f', respectively formed in the drums E and F, and in like manner the opposite ends of the vertical tubes G' will be secured to the U-shaped pipes E' and F' by similarly expanding them in suitable orifices e<sup>3</sup> and f<sup>3</sup>, respectively formed in those parts. On the other hand, when drums, pipes, and tubes of rectangular cross-section are employed the tubes G and G' instead of being expanded at their opposite ends in suitable orifices formed in their respective drums E and F and pipes E<sup>2</sup> and F<sup>2</sup> will be connected with them by means of nipples e<sup>4</sup>, which will be expanded at one of their ends in the respective drums E and F and pipes E<sup>2</sup> and E<sup>3</sup> and at their other in a suitable orifice with which the opposite ends of each of the tubes are provided, a similar form of connection e<sup>5</sup> being also employed for connecting the rear ends of the drums E and F with their respective cooperating pipes E<sup>2</sup> and E<sup>3</sup>, as shown.

With the parts connected as above described under either of the arrangements shown the boiler A is preferably disposed in the upper portion of the setting between the drums E E and in that position is connected with those drums, whereby not only is a combustion-chamber H and a passage-way I, leading from it to the rear end of the boiler, formed in the lower portion of the setting beneath the boiler, but the free circulation of the water and other contents of the boiler through these drums and the other parts of the setting or in a reverse direction permitted when the boiler is in operation. For supporting the boiler in the position mentioned various means may be employed, depending somewhat,

of course, upon the form of the boiler employed. In the form of boiler illustrated in the drawings, however, brackets a' are shown employed for the purpose, which, riveted or otherwise secured to its walls, extend outward over and rest upon the upper surface of the drums E E, while for connecting the boiler with these drums nipples or short pipes a<sup>2</sup> are made use of, which, disposed at the proper distances apart along the boiler and drums, are expanded at their opposite ends in suitable orifices respectively formed in the walls of the boiler and drums to receive them.

When the form of setting shown in Figs. 2, 3, and 4 is employed, the boiler A may be supported in such relationship to the drums E E as to bring the upper horizontal row of tubular flues a therein some distance below the axes of these drums, and when thus arranged the upper end of the upwardly-extending portion of the passage-way I may be closed by short pipes a<sup>3</sup>, which, placed side by side, extend from the rear end of the boiler to the U-shaped pipe E over such upwardly-extending portion and are expanded at their opposite ends in suitable orifices respectively formed to receive them in the rear end of the boiler and in such pipe. When, on the other hand, the form of setting shown in Figs. 5 and 6 is made use of, then the boiler A may be so supported with respect to the drums E E as to bring its upper horizontal row of flues a some distance above the upper surfaces of those drums, and in this case the upper end of the upwardly-extending portion of the passage-way I may be closed by an upwardly-curved row of horizontally-disposed tubes G<sup>2</sup>, which are preferably nipped at their opposite ends in upwardly-curved pipes E<sup>4</sup>, that extend upwardly from the upper tube of the series G' to the rear end of the boiler and are in turn secured at their opposite end in those parts, respectively, by appropriate nipples, as is the case with the connections of the other parts of the setting, as before explained. By the means described under either of these arrangements the upper end of the upwardly-extending portion of the passage-way I is effectually closed, and all heat and other products of combustion traveling upward through it are deflected into the rear ends of the tubular flues a for passage therethrough. When, however, the form of the invention involving the upwardly-curved row of horizontally-disposed tubes G<sup>2</sup> is employed, a space is left at each end of the row between it and its respective drum E, which is preferably closed by a suitable plate G<sup>3</sup>, fitted therein. With the side and rear walls of the setting and the top of the upwardly-extending portion of the passage-way I thus constructed of tubes, the adjoining tubes in any of these parts when constructed in circular form in cross-section may be either arranged in as close relationship to one another as is practical without

unduly weakening the parts in which their respective ends are expanded or at greater distance apart, as may be desired. When, on the other hand, these tubes are of rectangular form in cross-section, they may be disposed either in contiguous relationship or at any convenient distance apart, as may be preferred, and such tubes arranged with their sides in parallelism, as shown in Figs. 5 and 6, or at an angle to each other, as shown in Figs. 7 and 8.

In most instances the setting as thus far described will be found sufficiently strong and stiff to withstand all ordinary lateral strains that may be imparted to it in use or otherwise. When, however, additional strength or greater heating-surface is required, it may be found desirable at some times to employ cross-tubes K, which extending across the setting from one side thereof to the other beneath the boiler and alternately inclined in opposite direction with respect to the horizon are respectively connected at their opposite ends by appropriate nipples with the vertical tubes G on the opposite sides of the setting, as shown in Figs. 5 and 6, whereby the free circulation of the water and steam from these vertical tubes through them is permitted.

The setting being constructed as above described may be supported upon the floor or otherwise, as may be desired. It is preferred, however, to support it upon a suitable base L, which in the form thereof selected for purposes of illustration is constructed of a height sufficiently great to afford an ample ash-pit M therein. In some instances this base may be constructed of brick or other masonry. In the drawings, however, it is shown constructed of metal plates, which are constructed of the proper lengths and breadths to form its respective sides  $l$  and rear  $l'$ . As thus constructed the rear ends of the side plates  $l$  are preferably connected with the respective ends of the rear plate  $l'$  by appropriate angle-irons  $l^2$  and rivets  $l^3$ , with the upper and lower edges of both of these plates strengthened by angle-irons  $l^4$  and  $l^5$  extending along their sides and secured to them by appropriate rivets  $l^6$ . As thus strengthened the angle-irons  $l^4$  and  $l^5$  may be respectively secured to the extreme top and bottom edges of plates  $l$  and  $l'$  and on one or both sides thereof, or the angle-iron  $l^5$  may be secured to the extreme bottom edges of those plates and the angle-iron  $l^4$  disposed only on the outside of the same and at a short distance below their upper edges. In Figs. 5 and 6 is shown the first of these arrangements, and when this form of construction is employed the setting B will rest directly upon the extreme top of the base. In Figs. 1, 2, and 4, on the other hand, the other of these arrangements is shown, and when this embodiment of the invention is made use of the base will preferably be constructed of a size to permit of its upper

edge extending upwardly on the inner sides of the drum F F and curved pipe F', and the setting will rest wholly upon the angle-irons  $l^4$ . While the setting B is thus supported, the base L is separated from the combustion-chamber H by the grate-bars N, that are preferably disposed upon transverse bars N', which in turn are either supported from the walls of the base or from the lower drums F F of the setting, as may be desired. When supported from the walls of the base, the sustaining means employed may consist of brackets or angle-irons  $n$ , upon which the ends of the bars N' rest and which are secured to the interior of those walls by suitable rivets  $n'$ , as shown in Figs. 2 and 4. On the other hand, when supported from the drums F F appropriate saddles  $n^2$  are preferably made use of, which, provided with overturned ends for engaging with the drums, are constructed with suitable U-shaped seats, in which the ends of the bars N' rest, as illustrated in Figs. 5 and 6. With the combustion-chamber H thus located in the lower portion of the setting B there is employed a bridge-wall O, which not only extends across from one side of the setting to the other, but also from the floor upon which the base L rests upwardly to the required elevation, and in addition to forming the rear walls of the combustion-chamber it also serves to deflect the heat and other products arising from the combustion upwardly against the under surface of the boiler A, as is common to bridge-walls as heretofore in use. In Fig. 4 it is shown as constructed wholly of fire-brick or other similar heat-resisting materials. In Fig. 5, on the other hand, the lower portion of this bridge-wall is constructed of a metal plate  $o$ , which, extending across the base from one side thereof to the other, is secured at its respective ends to the walls thereof by suitable angle-irons  $o'$  and rivets  $o^2$  and is not only provided on its lower edge with appropriate angle-irons  $o^3$ , but also with similar angle-irons  $o^4$  along its top edge as well. On the lower portion as thus constructed rests the upper portion of the walls, which, as shown in the drawings, is similarly constructed of fire-brick or other refractory material and is faced on its back with a vertical row of tubes  $o'$ , which, extending across the setting from one side thereof to the other, are respectively connected at their opposite ends with the vertical tubes G on those sides by appropriate nipples, whereby the water and steam from these tubes may circulate freely through the vertical tubes and the heat communicated to the wall and to the tubes in passing from the combustion-chamber over them availed of as an aid in heating the water and other contents of the boiler and setting. In addition to thus providing for the circulation of the water and other contents of the boiler through the side and rear walls of the setting and through the tubes on the rear face

of the bridge-walls it is also found desirable to provide for their circulation around the stoke-holes P, through which the fuel is supplied to the combustion-chamber H when required. To this end the walls of each of these holes are constructed either of a single tube bent around into the proper shape to form them and joined at its opposite ends, whereby it is made continuous throughout, as shown in Figs. 4 and 9, or of a number of horizontal and vertical tubes, as shown in Figs. 5 and 6. When the first of these constructions is employed, the tube  $p$ , from which the walls of the stoke-hole are produced, is preferably constructed in rectangular parallelogrammatic form in cross-section and is respectively connected with the boiler A and with the adjoining drum F by tubes  $p'$  and  $p''$ , the first of which are expanded at one of their ends in the tube  $p$  and at the other of their ends in the boiler A and the other of which are similarly expanded at one of their ends in such tube  $p$  and at their other ends in the drum F. When, on the other hand, the other of these constructions is made use of, the horizontally-disposed tubes  $p^3$  and  $p^4$  are employed, which, extending across the setting from one side thereof to the other above and below the stoke-holes P, respectively, are connected at their opposite ends by suitable nipples with corresponding vertical tubes G on those sides and are themselves connected at appropriate distances apart to form the side walls of the stoke-holes by vertical tubes  $p^5$ , which, extending between those former tubes, are respectively secured at their opposite ends to them by suitable nipples, as shown.

With the boiler arranged in the setting as shown in Figs. 2, 3, and 4 and the first of the above-mentioned construction of stoke-holes employed the presence of cross-tubes at the front of the setting will not in most instances be required. On the other hand, with the boiler arranged as shown in Figs. 5 and 6 and the other of the constructions of stoke-holes availed of a number of cross-tubes  $p^6$  and  $p^7$ , &c., may be employed above the tubes  $p^3$ , which, extending across the front of the setting and connected at their opposite ends with corresponding vertical tubes G G on opposite sides of the setting by appropriate nipples, has the upper tube  $p^6$  of the series connected with the boiler A by short tubes  $p^8$ , extending between them and expanded at their opposite ends in the boiler and such upper tube, respectively. While the circulation of the water and other contents of the boiler through the front of the setting is thus provided for, the waste products of combustion passing upward from the combustion-chamber through the tubular flues  $a$  are conducted from the front end of those tubes to the place of discharge by an uptake R, which extends upward from such flues to a convenient chimney or flue (not shown) and has its lower end pref-

erably disposed in a line with or at a short distance above the upper horizontal row of those flues, as shown.

For covering the tubular portions of the side and rear walls of the setting, as well as the top of the upwardly-extending portions of the passage-way I and the top of the boiler, any of the ordinary and well-known forms of boiler-covering may be employed, and the same may be either applied to those parts in plastic form and hardened thereon after having been so applied, as shown at S in Figs. 3 and 4, or the same may be first made into blocks or sheets and applied in that form, as shown in Figs. 2 and 5. When applied in plastic form, the covering materials will be spread over the sides and other parts to be covered of a uniform thickness by a trowel or otherwise, as shown, for instance, in Fig. 4, and in that condition allowed to dry and harden, forming when fully set an efficient covering for them. When, on the other hand, the covering S is made in the form of independent blocks or sheets, the material composing them may be either fashioned in molds of the required shapes and used in that form after having been hardened without a metal covering or firmly packed in metal covers, as shown, for instance, in Letters Patent No. 524,878, which were granted to me August 21, 1894, and when hardened therein used in that form. As thus constructed in either of these forms the blocks or sheets covering the vertical walls may either rest upon the angle-irons  $l^1$  on the base L or upon a suitable Z-bar  $s$ , extending along the side beneath it and secured by rivets or otherwise to the vertical tubes G and G', with the walls held in place either by bolting or otherwise securing them to those tubes, or by a second Z-bar  $s'$ , extending along the top thereof and similarly secured to the vertical tubes, as shown in Fig. 2, while the blocks or sheets composing the remainder of the covering may be joined and held in place by appropriate angle-irons and straps, as is common to the construction described in the above-mentioned patent and requires no further description herein.

In addition to the above-mentioned covering for the boiler and setting it is preferred to fill the spaces around and above the stoke-holes P with fireproof material, as shown, for instance, at T in Fig. 4, and this may be applied to them in plastic form or otherwise, its object being to prevent the escape of the heat from the combustion-chamber in that direction.

For closing in the front of the setting and the front of the boiler a metal casing U is employed, which is preferably constructed of a form to correspond with those parts and is held in place by screws  $u$ , which enter and engage with appropriate threaded orifices formed in the front ends of the drums E and F, respectively. As thus constructed and

held in place this casing is provided not only with suitable openings opposite the stoke-holes and the front of the ash-pit, which are respectively closed by doors  $u'$  and  $u''$ , but also with an opening above the doors  $u'$ , through which access may be had to the front ends of the flues  $a$  and which is similarly closed by doors  $u^3$ , which, hinged to the casing U by suitable hinges  $u^4$ , are so constructed that while they shut closely against the face of the casing at their lower end they gradually bulge outward in curvilinear form from that end to their top, which is adapted to receive the lower end of the uptake R and closely fit the same. By this means, as will be seen, not only is ready access to the flues  $a$  permitted, but a connection between the uptake and all of these flues thereby afforded.

With the setting constructed as above described it is to be understood that the various drums, tubes, and pipes will be provided with appropriate hand-holes opposite the points where the ends of other tubes, pipes, or nipples enter them, through which access may be had to expand the ends of such other tubes, pipes, or nipples, and these hand-holes may be closed by suitable caps or covers threaded into or otherwise secured over them, as shown at  $t$  in the various figures of the drawings. In a similar manner the drums F, which serve in a measure as mud-drums, are provided with a suitable blow-off pipe  $f^4$ , that is or may be equipped with an appropriate cock  $f^5$ , as is common to pipes of this character as heretofore in use.

With a setting constructed as above set forth and a boiler mounted therein the heat and other products arising from the combustion of the fuel in the combustion-chamber will first impinge against the under surface of the boiler and, being thereby deflected backward, will pass over the bridge-wall and along the passage-way leading from the combustion-chamber, where reaching its rear wall they will next impinge against the tubes and pipes therein and be deflected upward along the upwardly-extending portion of such passage-way, where reaching the upper end of this upwardly-extending portion they will in turn be deflected inward by their contact with the tubes in the top thereof and enter the tubular flues in the boiler, through which they will then pass to the uptake and thence to the chimney or flue, whence what are remaining will be discharged. In following this course and meeting the various abrupt deflections, however, a portion of the heat traveling with the other products will be absorbed by the various tubes and pipes along its course and be thereby availed of for heating the water and other contents circulating through them, while the other products in passing along with it in the sinuous course in a close chamber will in great measure be consumed, with the consequent effect of maintaining the heat

after leaving the combustion-chamber at a higher degree in its subsequent travel than would otherwise be possible if such consumption did not occur. Moreover, while the boiler and the tubes and pipes composing the rear of the setting are thus heated by the direct contact of the heat and the other products arising from the combustion the tubes and pipes in the sides and other portions of the setting are also being heated by the heat radiated by the combustion in the combustion-chamber and the flame passing onward through the passage-way leading therefrom, and thereby the heat that would otherwise be absorbed by the walls if constructed of brick or other masonry also availed of for heating the water and other contents of the boiler circulating through them, and the destructive effects of the same upon the covering of the boiler and setting as a consequence in a great measure avoided. It will thus be seen that a setting for boilers is produced which while simple and compact in construction and preventing both the radiation of heat therefrom and its absorption by the walls of the setting, with the consequent loss thereof when the latter are constructed of brick or other form of masonry, not only increases the water and steam-heating surfaces exposed to the radiant and other heat to a great degree and permits of the ready removal and replacement of the heat-non-conducting covering when the inspection or repair of the parts are required, but one that occupies but the minimum of space, is practically indestructible, and is ornamental in appearance as well.

Although in the foregoing the best means contemplated for carrying the invention into practice has been described, it is obvious that the same may be modified in various ways and the spirit of the invention retained.

Having now described the invention and specified certain of the ways in which it is or may be carried into effect, what is claimed, and desired to be secured by Letters Patent of the United States, is the following:

1. The combination, with a boiler, an upper and an under horizontally-disposed drum on each side of the setting made continuous throughout, and tubes extending between and connecting them, of means for closing the rear end of the setting extending across from the drums and tubes on one side of such setting to the drums and tubes on the other side thereof, substantially as described.

2. The combination, with a boiler, an upper and under horizontally-disposed drum on each side of the setting, and tubes extending between and connecting them, of a series of tubes extending across the back of the setting from the drums and tubes on one side thereof, to the drums and tubes on the other, substantially as described.

3. The combination, with a boiler, an upper and an under drum on each side of the set-

ting, and tubular members through which the upper and under of these drums on one side are respectively connected with the upper and under drum on the other side, of tubes extending between and connecting the upper and under drums, and the upper and under connecting members respectively, substantially as described.

4. The combination, with a setting for boilers having the side walls of both the combustion-chamber and the passage-way that conducts the products of combustion from such chamber and the rear walls of said passage-way constructed of tubular members through which the water to be heated circulates, of a bridge-wall arranged in rear of the combustion-chamber and provided with a series of tubes on its rear face through which the water from the side walls of the setting circulates, substantially as described.

5. The combination, with a setting for boilers having the vertical walls of both the combustion-chamber and the passage-way for conducting the product of combustion from such chamber severally constructed of upper and under horizontally-disposed drums with connecting-tubes between them, of a boiler mounted in such setting and connected by tubular connection with the sides thereof, substantially as described.

6. The combination, with a setting for boilers having the vertical walls of both the combustion-chamber and the passage-way for conducting the products of combustion from such chamber and the rear walls of said passage-way severally constructed of upper and under horizontally-disposed drums with connecting-tubes between them, of a boiler mounted in such setting and connected by tubular connections with the sides and rear thereof, substantially as described.

7. The combination, with a setting for boilers having the side walls of both the combustion-chamber and the passage-way for conducting the products of combustion from such

chamber and the rear and top walls of said passage-way constructed of tubular members through which the water to be heated circulates with the members of the side walls composed of upper and under horizontally-disposed drums and connecting-tubes between them, of a boiler mounted in such setting, and a heat-non-conducting covering applied to the outer surface of the boiler and setting, substantially as described.

8. The combination, with a setting for boilers, having the side walls of both the combustion-chamber and the passage-way for conducting the products of combustion from such chamber, and the rear walls of said passage-way constructed of tubular members, with the members of the side walls composed of upper and under horizontally-disposed drums and connecting-tubes between them, of a boiler having tubular flues extending longitudinally of the same mounted in such setting and connected by tubular connections with the side and rear walls thereof, an uptake arranged in front of the boiler, and a front to the setting provided with hinged doors, which close over the front end of the boiler-flues and are adapted to receive and fit the lower end of the uptake, substantially as described.

9. The combination, with a boiler, the tubular walls of the combustion-chamber, and the tubular walls of the stoke-hole, of tubular connections between these parts whereby the circulation of the water and other contents of the boiler through the tubular walls of the combustion-chamber and through the tubular walls of the stoke-holes is permitted, and the tubular side walls of the combustion-chamber are connected with the boiler across the front of the setting, substantially as described.

In testimony whereof I have hereunto set my hand this 19th day of November, 1902.

AMASA WORTHINGTON.

Witnesses:

WM. MILLER,  
R. F. SWEENEY.