

J. J. MOONEY.
WATER TUBE BOILER.
APPLICATION FILED MAR. 7, 1910.

1,042,709.

Patented Oct. 29, 1912.

5 SHEETS—SHEET 1.

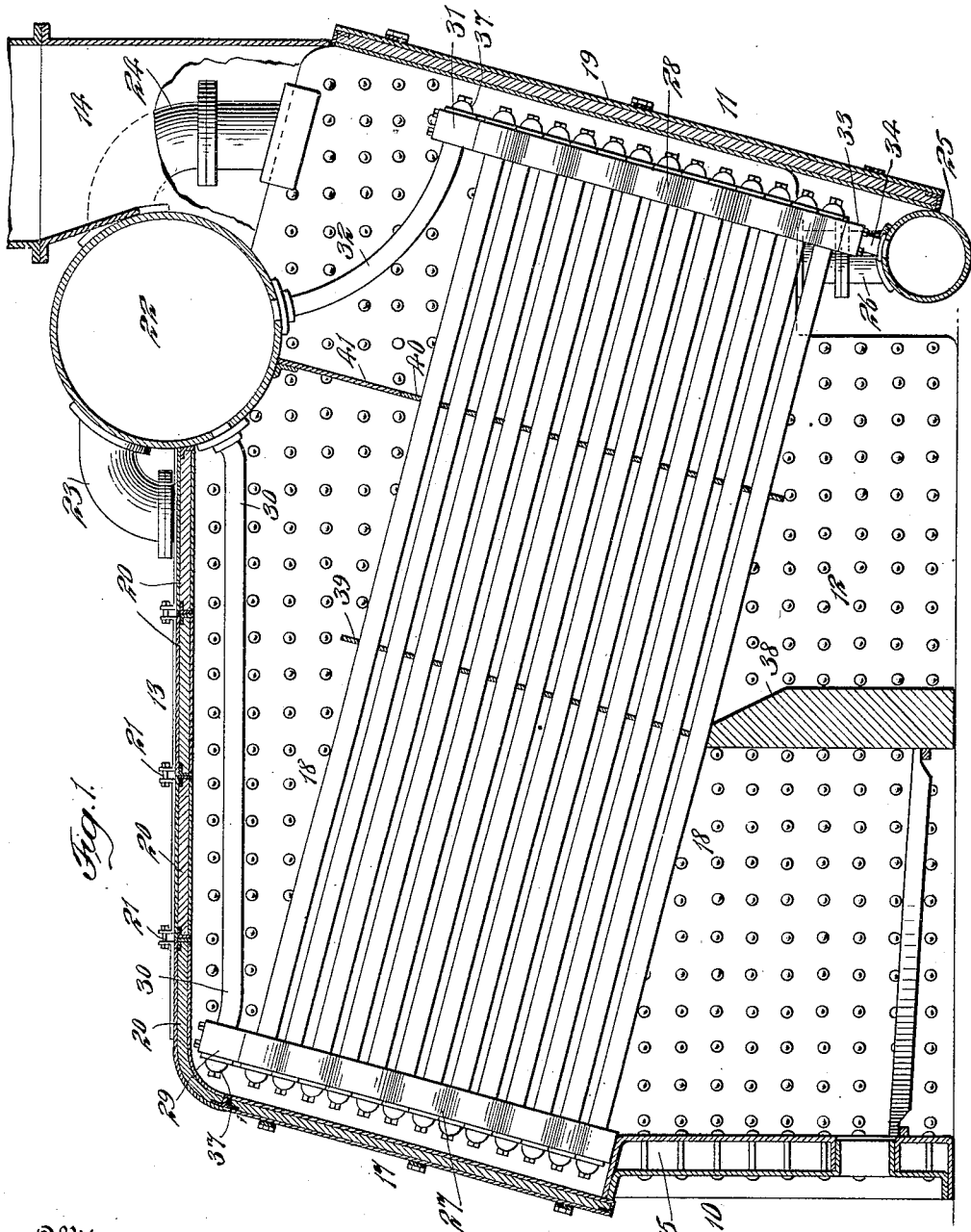


Fig. 1.

Witnesses:
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Arthur Marion

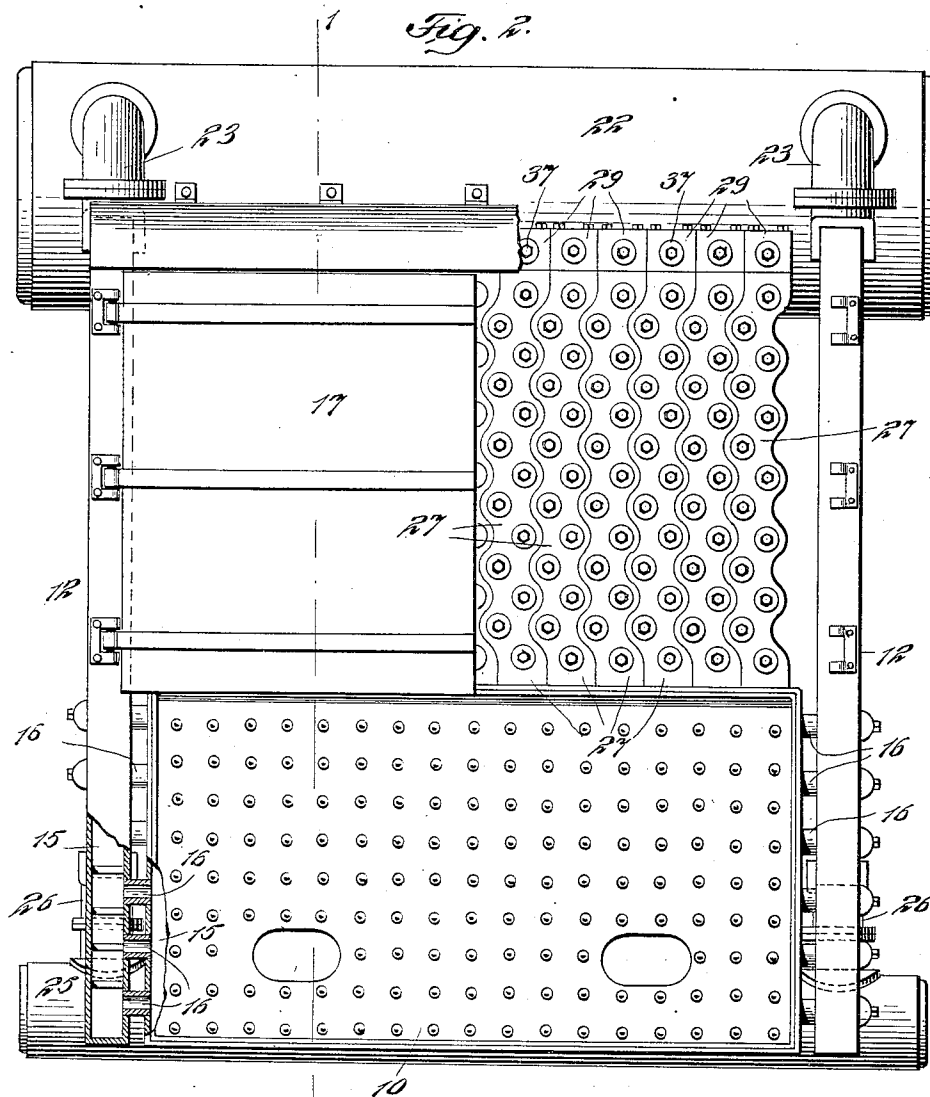
Inventor
John J. Mooney
By his Attorney *Chas. E. Gill*

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5 SHEETS—SHEET 2.



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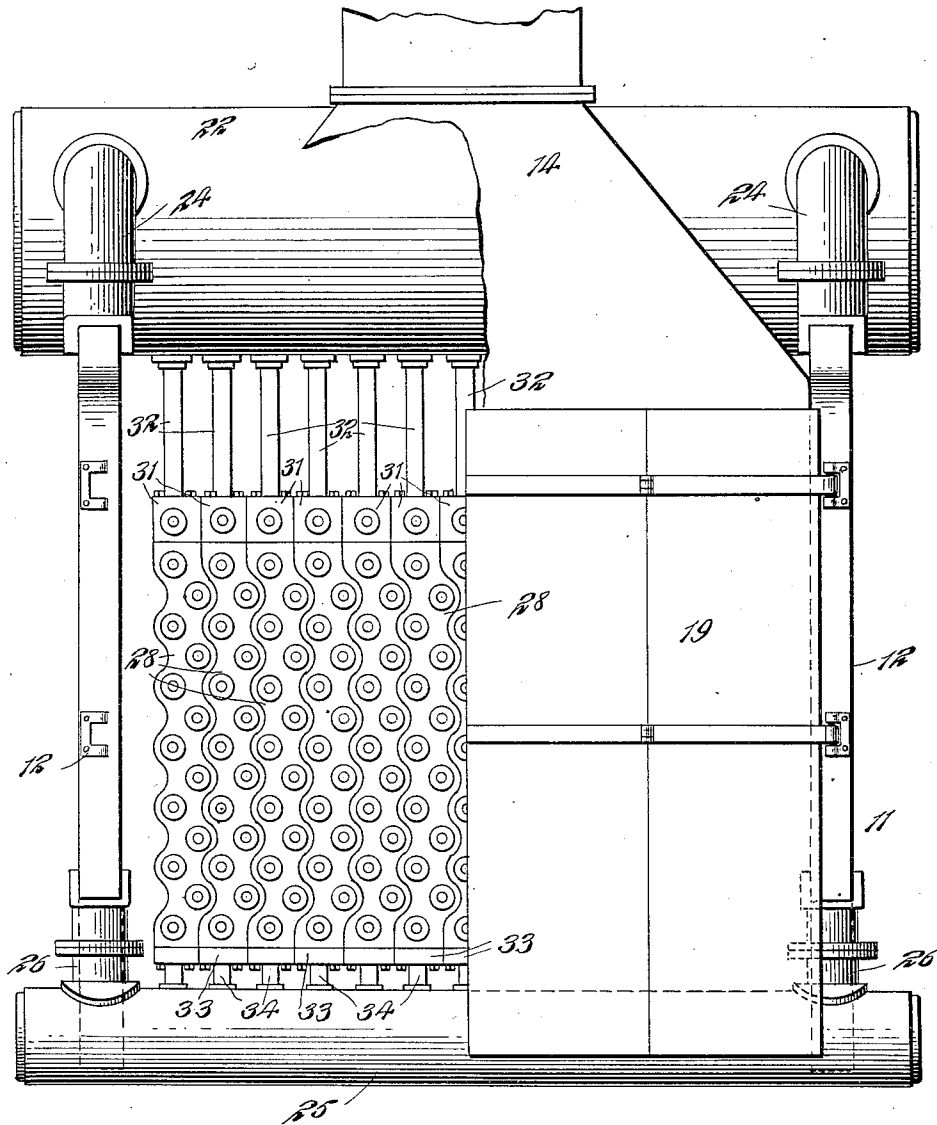


Fig. 3.

Witnesses:
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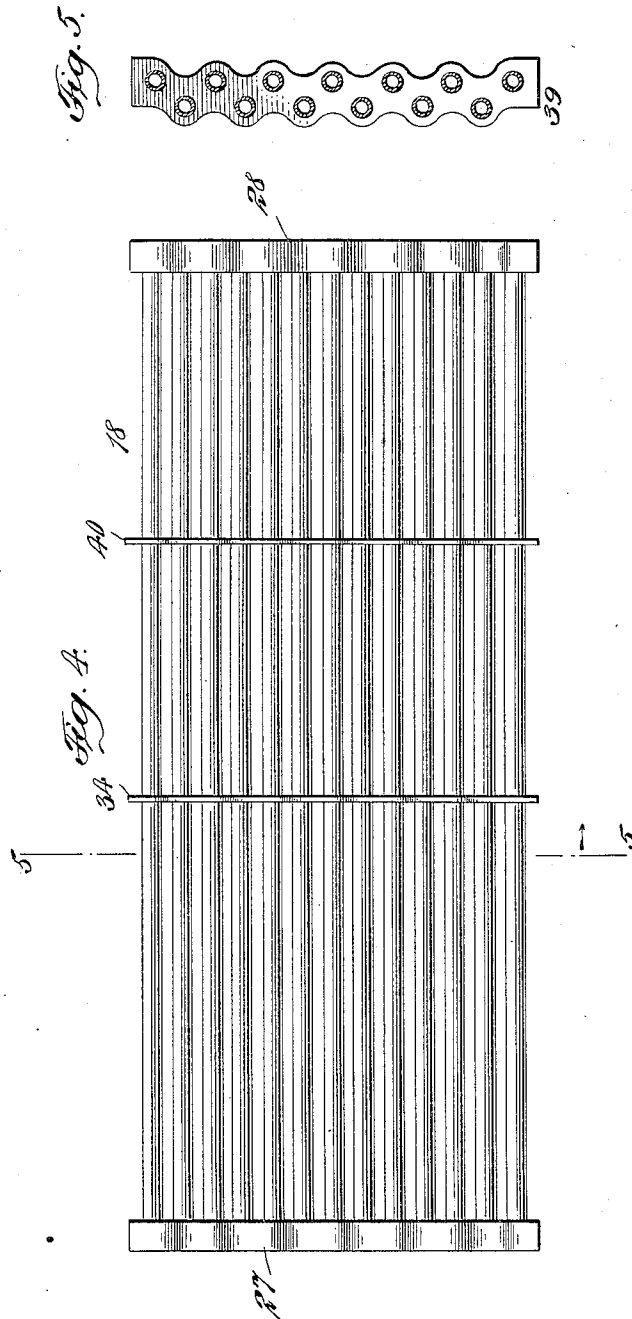
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5 SHEETS—SHEET 4.



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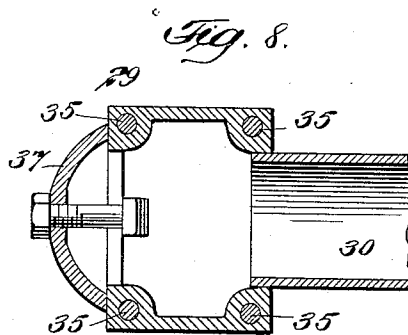
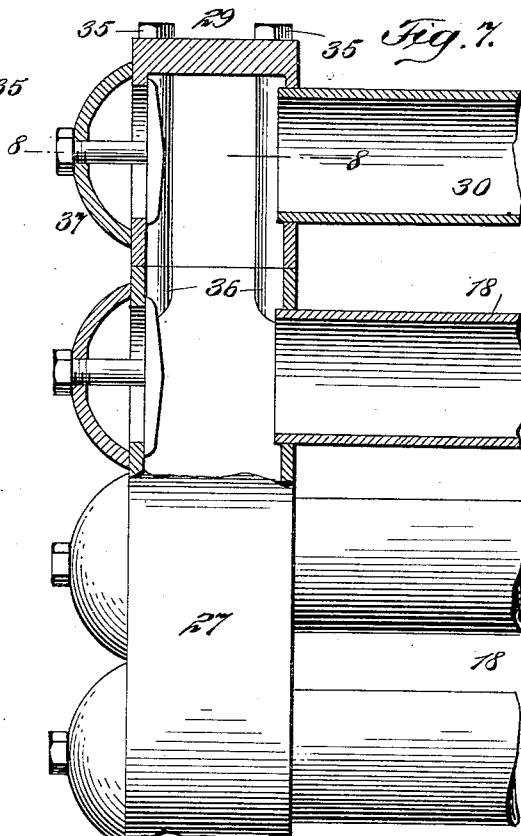
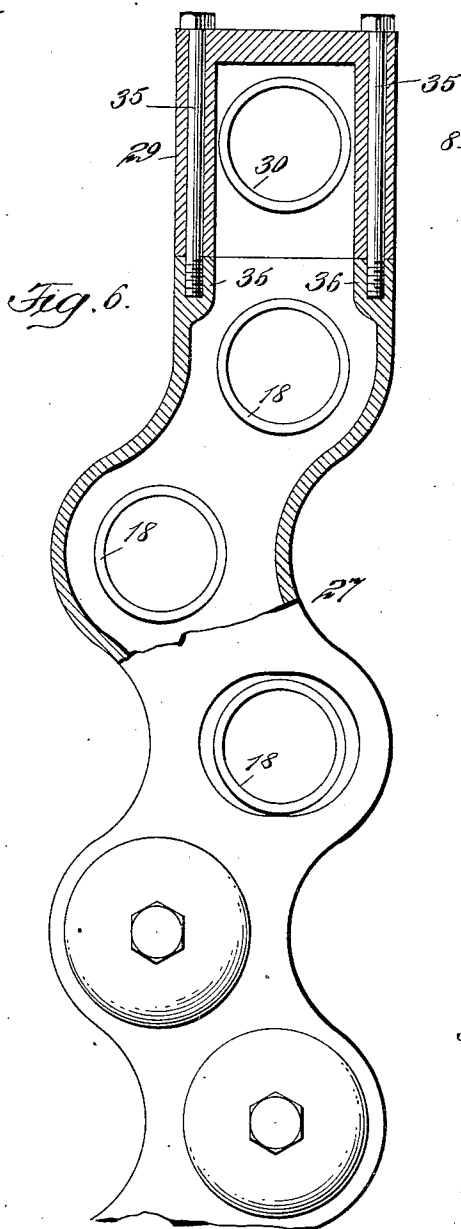
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5 SHEETS—SHEET 5.



Witnesses:
Arthur Marion

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UNITED STATES PATENT OFFICE.

JOHN J. MOONEY, OF NEW YORK, N. Y.

WATER-TUBE BOILER.

1,042,709.

Specification of Letters Patent.

Patented Oct. 29, 1912.

Application filed March 7, 1910. Serial No. 547,648.

To all whom it may concern:

Be it known that I, JOHN J. MOONEY, a citizen of the United States, and a resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Water-Tube Boilers, of which the following is a specification.

The invention relates to improvements in steam boilers, and particularly to improvements in the type thereof known as water tube boilers, and consists in the novel features, arrangements and combinations of parts hereinafter described and particularly pointed out in the claims.

The object of my invention is to improve water tube boilers in their general construction and details, and particularly to provide an efficient water tube boiler in which repairs to the tubes and their headers may be quickly made.

In accordance with my invention the bank of water tubes consists of a series of vertical sets of tubes connected at their ends with independent headers which are independently secured, the arrangement being such that any one or more of said sets of tubes with their headers may be independently removed from the boiler, in case of necessity, and a corresponding set of tubes with their headers, to be carried in stock, substituted for the damaged part, it being only necessary with my invention to detach and remove one entire set of tubes and their headers and slide a substitute set of tubes with their headers into position in place of the removed section. The general casing or shell of the boiler is so constructed that whenever desired the entire bank of water tubes may be removed and replaced with entire convenience and minimum labor and expense. My boiler is preferably provided or formed with hollow front and side walls in communication with each other and with the steam and mud drums. Each header section at the front end of the bank of tubes is independently connected by piping with the steam drum, and each header section at the rear end of the bank of tubes is independently connected at its upper end with the steam drum and at its lower end with the mud drum. The baffle plates are made up of sections matching each other, and each section being carried by the tubes constituting a vertical section of the bank of tubes.

The invention will be fully understood

from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which:

Figure 1 is a vertical section on the line 1—1 of Fig. 2 of a water tube boiler constructed in accordance with and embodying my invention; Fig. 2 is a front elevation, partly broken away and partly in section, of the same, one of the doors in line with the bank of tubes being omitted; Fig. 3 is a rear end view, partly broken away, of the same, the left hand door in line with the bank of tubes being omitted; Fig. 4 is a detached side elevation of one removable section of the bank of tubes; Fig. 5 is a vertical transverse section of the same on the dotted line 5—5 of Fig. 4; Fig. 6 is an enlarged detached front view, partly broken away and partly in section, of one of the heads connected with one vertical set of the tubes, one of the man-hole plates being omitted therefrom and the head being shown as connected at its upper end with a cap connected with one of the tubes leading directly to the upper drum; Fig. 7 is a side elevation, partly in section and partly broken away, of the same; and Fig. 8 is a horizontal section through a portion of same on the dotted line 8—8 of Fig. 7.

In the drawings, 10 designates the front, 11 the rear end, 12 the sides, 13 the top, and 14 the up-take of the boiler-casing. The front 10 and sides 12 are formed of separated iron sheets suitably connected by stay bolts and forming between them water chambers 15 which communicate with one another, the chamber 15 in the front 10 being connected by pipes 16 (Fig. 2) with the chambers formed in the hollow sides of the boiler so that there may be a circulation of the water through said sides and said front. Above the front 10 the upper front portion of the boiler is formed with hinged doors 17, there being preferably two of these doors and said doors being secured at their outer edges to the sides 12. The doors 17 close an opening sufficient in size to permit of the insertion or withdrawal of the entire bank of water tubes 18 with their headers annexed thereto. The rear end of the combustion chamber or boiler is formed by hinged doors 19, there preferably being two doors 19, one hinged to each of the sides 12 and each door being in two hinged sections, as shown in Fig. 3. When the doors 19 are opened they expose all of the headers at the rear end of

the bank of tubes 19. The top of the boiler is formed of sections 20 adapted to be secured together by bolts 21 (Fig. 1). I have so constructed the boiler-casing that it may be readily constructed and erected and also so that the interior of the furnace may be readily gotten at and all or any section of the bank of tubes 18 removed and replaced at will. At the upper rear portion of the boiler is located the transverse steam drum 22, which by means of piping 23, 24 is, at its ends, connected with the chambers formed in the hollow sides 12, the piping 23 connecting with the hollow sides 12 at the front of the steam drum and the piping 24 connecting with said sides at the rear thereof. At the lower rear portion of the boiler is provided a suitable mud drum 25, and this drum at its ends is, by piping 26, connected with the hollow sides 12.

The bank of tubes 18 is composed of a series of vertical sections each comprising a set of tubes arranged in serpentine or zig-zag form connected at their front and rear ends with headers 27, 28, respectively. The headers 27, 28 are hollow and receive at their inner faces the ends of the tubes while at their outer faces and in line with the tubes said headers are provided with suitable hand-holes and covers therefor, as more clearly illustrated in Figs. 6, 7 and 8. There is a separate pair of front and rear headers 27, 28 for each vertical section of the bank of tubes 18, and these headers are of serpentine edge outline and all of the headers are adapted to nest together in the manner illustrated in Figs. 2 and 3, the headers constituting in effect a solid wall but being independent of one another. The headers 27 correspond exactly with the headers 28, and each of the front headers 27 is independently connected by means of a cap 29 and pipe 30 with the steam drum 22, while each of the headers 28 is, at its upper end, independently connected by means of a cap 31 and pipe 32 with said steam drum. The series of pipes 32 and caps 31 are more clearly illustrated in Fig. 3. Each of the rear headers 28 at its lower end is connected by a cap 33 and pipe 34 with the mud drum 25. The caps 29, 31 correspond with each other and each is of the construction more clearly illustrated in Figs. 6, 7 and 8, the cap being in the form of a hollow casing open at its lower end to communicate with the interior of the header to which it is removably fastened by bolts 35 which pass downwardly through interiorly thickened corner portions of the cap and enter like thickened corner portions 36 formed at the upper end of the header. Each cap 29, 31 has an opening in its outer face closed by a hand-hole plate 37. The hand-holes in the caps 29 are in line with the pipes 30 secured to said caps and communicating with the interior thereof. The

hand-holes in the caps 31 are in line with the pipes 32 which are secured to and communicate with the interior of said caps 31. The caps 33 are bolted to the lower ends of the rear headers 28 and afford communication from the interior of said headers through the pipes 34 to the mud drum 25.

The bank of tubes 18 is inclined and the front end of this bank rests upon the top of the front 10, while the lower end of the bank is supported from the mud drum 25. The bridge wall 38 is at about a central point below the bank of tubes and may aid in supporting the same. Each baffle plate 39, 40 is in sections corresponding in outline with the headers 27, 28 and strung upon the sections of the bank of tubes, as illustrated in Fig. 5. The rear baffle plate 40 at its upper edge matches the lower edge of a stationary baffle plate 41 connected with the steam drum 22. Since my purpose is to enable the removal of any one or more sections of the bank of tubes 18 with the least amount of trouble and without disturbing the other sections, I make the baffle plates 39, 40 in the form of sections so that when a section of the bank of tubes is withdrawn it will carry with it its particular sections of said baffle plates.

The water circulation through the tubes, sides and front of the boiler will be understood without special description.

In the construction presented by me any section of the bank of tubes may, in case of necessity, be detached from the mud drum and from its caps 29, 31 and be bodily withdrawn from the boiler either through the front or rear end thereof, and this is a feature of very great importance since it results in a great saving of time, labor and expense. Any one section of the bank of tubes being defective may be quickly withdrawn and another section of tubes carried in stock immediately substituted therefor, thus at once placing the boiler in condition for continued use and permitting the defective section of tubes to be repaired at the convenience of the owner.

The pipes or nipples 16 connecting the front 10 with the sides 12 will be expanded into the openings in said parts and at the outer side of the sides 12 in line with said nipples or pipes 16 will be provided suitable hand-holes of customary character. The piping 23 is in two connected sections, one secured to the steam drum and the other flanged (Fig. 2) to the sides 12. The piping 24 is also in two parts, one secured to the steam drum and the other to the sides 12. The piping 26 is likewise in two separable parts, one connected to the mud drum and the other to the sides 12. The pipings 23, 24 and 26 are in separable sections for convenience in constructing, shipping and erecting the boiler.

The invention is not limited to all of the details shown, since many of such details will vary with conditions to be met and the individual judgment.

5 The headers 27, 28 and their parts are to be made the subject of a separate or divisional application for Letters Patent.

What I claim as my invention and desire to secure by Letters Patent, is:

10 1. In a water-tube boiler, an inclosing casing whose sides are of separated plates connected by stay-bolts and form within them adequate water-chambers, a steam-drum, 15 pipe-sections at opposite sides of each end of said drum connecting the same with the chambers formed between the plates of said sides, a mud-drum connected at its ends with said chambers in said sides, a bank of water-tubes in individual vertical sections having 20 headers at their front and rear ends, individual pipes connecting the upper ends of the respective headers with said steam-drum and pipes connecting the lower ends of the rear headers with said mud-drum; substan- 25 tially as set forth.

2. In a water-tube boiler, an inclosing casing whose sides are of separated plates connected by stay-bolts and form within them adequate water-chambers, a transverse steam-drum mounted on said sides, separable pipe- 30 sections constituting nozzles at the front and rear of said steam-drum connecting the same with the chambers formed between the plates of said sides, a mud-drum connected at its ends with said chambers in said sides, 35 a bank of water-tubes in individual vertical

sections having headers at their front and rear ends, individual pipes connecting the upper ends of the respective headers with said steam-drum, and individual pipes con- 40 necting the lower ends of the rear headers with said mud-drum; substantially as set forth.

3. In a water-tube boiler, an inclosing casing whose sides and lower front portion are 45 of separated plates connected by stay-bolts and form within them adequate water-chambers, a series of nipples connecting the ends of the front water chamber with the front ends of the side water chambers, a trans- 50 verse steam-drum mounted on said sides, separable pipe-sections constituting nozzles at the front and rear of said steam-drum connecting the same with the chambers formed between the plates of said sides, a 55 mud-drum connected at its ends with said chambers in said sides, a bank of water-tubes in individual vertical sections having headers at their front and rear ends, individual pipes connecting the upper ends of the re- 60 spective headers with said steam-drum, and individual pipes connecting the lower ends of the rear headers with said mud-drum; substantially as set forth.

Signed at New York city, in the county 65 of New York and State of New York, this 5th day of March, A. D. 1910.

JOHN J. MOONEY.

Witnesses:

CHAS. C. GILL,
ARTHUR MARION.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."