(No Model.) 4 Sheets—Sheet 1.

M. A. DESPEISSIS.

DRAFT REGULATOR.

No. 392,014. Patented Oct. 30, 1888.

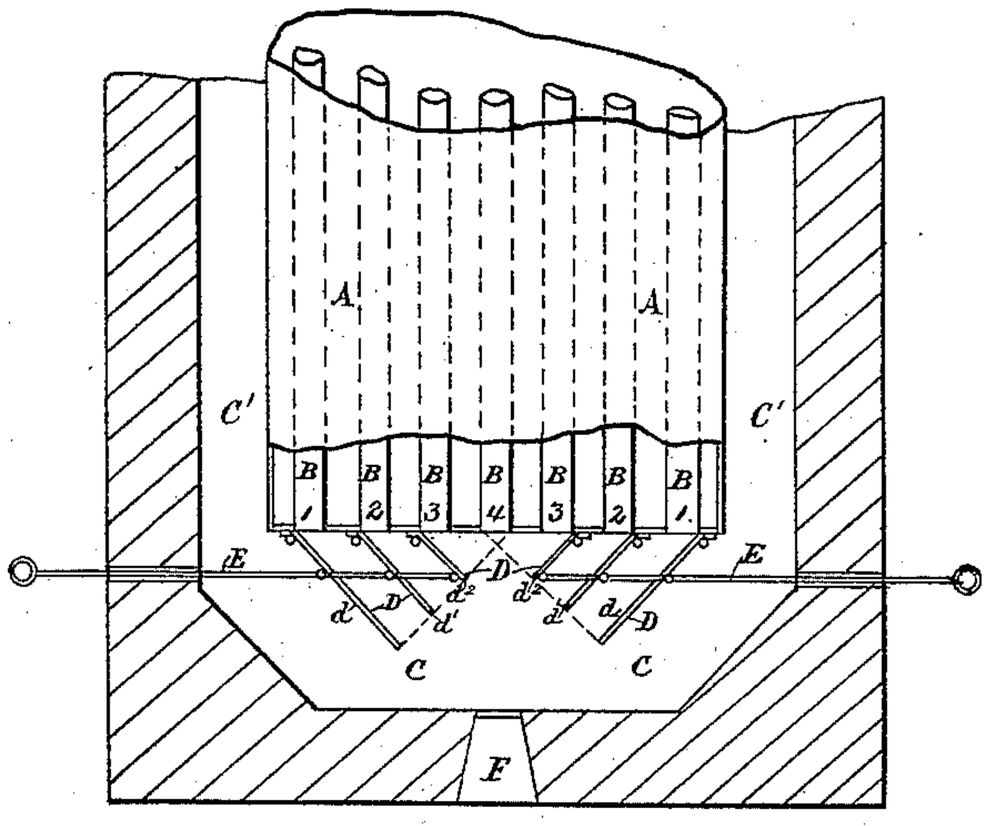


Fig: 1.

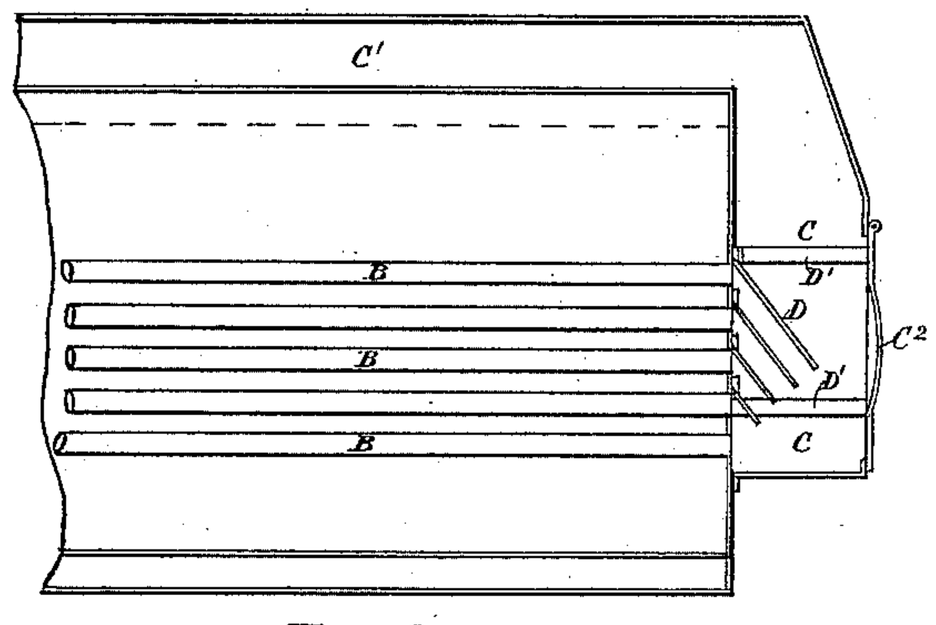


Fig: 6.

Attest:-
H. C. Fulter.
G. No. Hallaher

Inventor:-
Marie Augustin Despeissis
by Henry Orth
Attorney.

(No Model.) 4 Sheets—Sheet 2.

M. A. DESPEISSIS.

DRAFT REGULATOR.

No. 392,014. Patented Oct. 30, 1888.

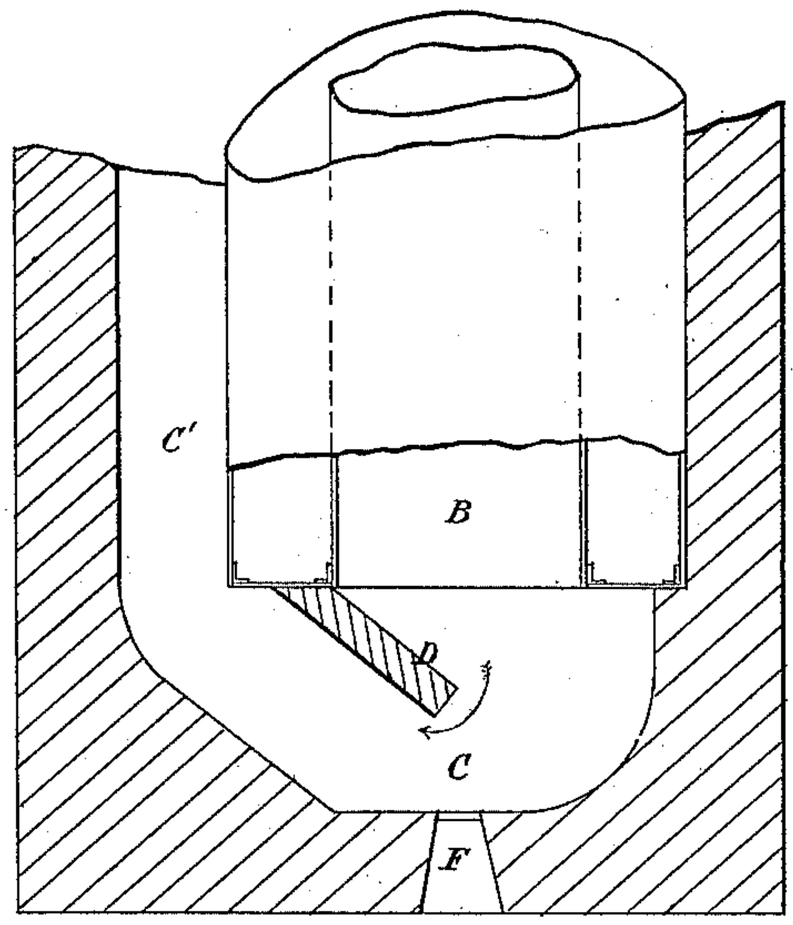


Fig: 3.

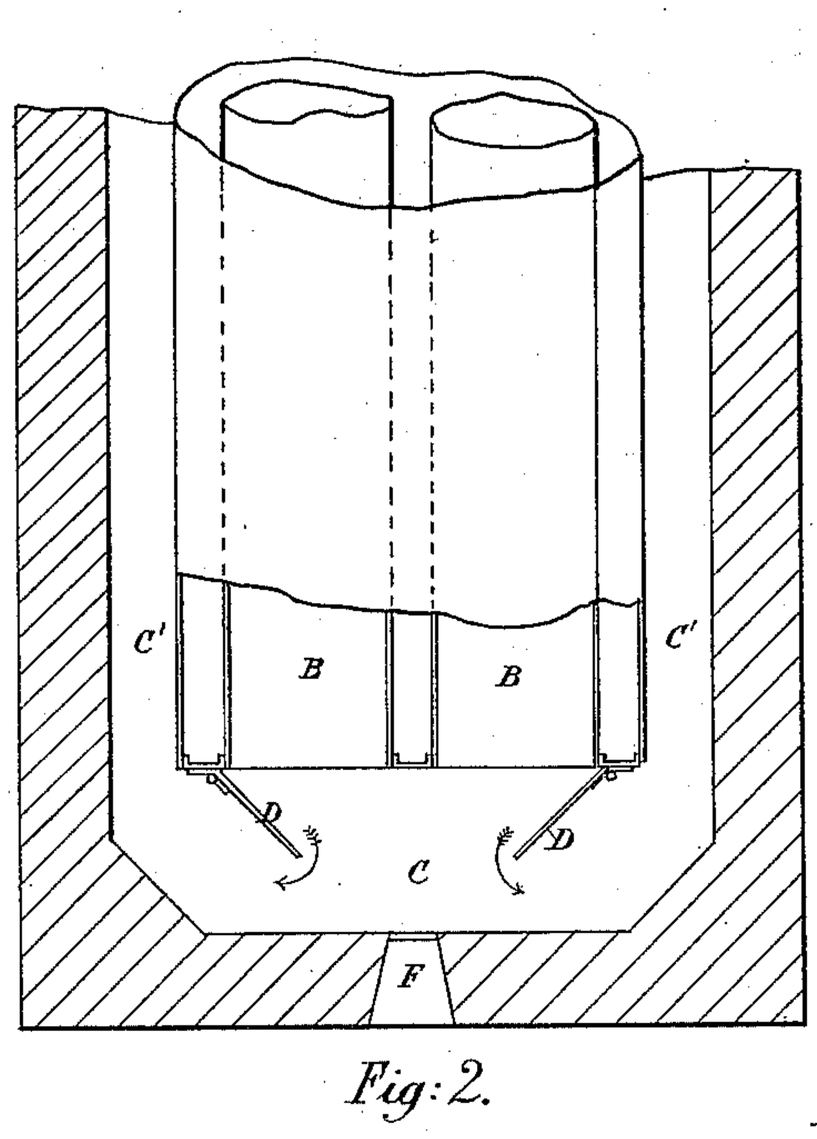


Fig: 2.

Attest:-
W. E. Coulter.
C. M. Gallaher.

Inventor:-
Marie Augustin Despeissis.
by Henry A. Wh.
Attorney.

(No Model.) 4 Sheets—Sheet 3.

M. A. DESPEISSIS.

DRAFT REGULATOR.

No. 392,014 Patented Oct. 30, 1888.

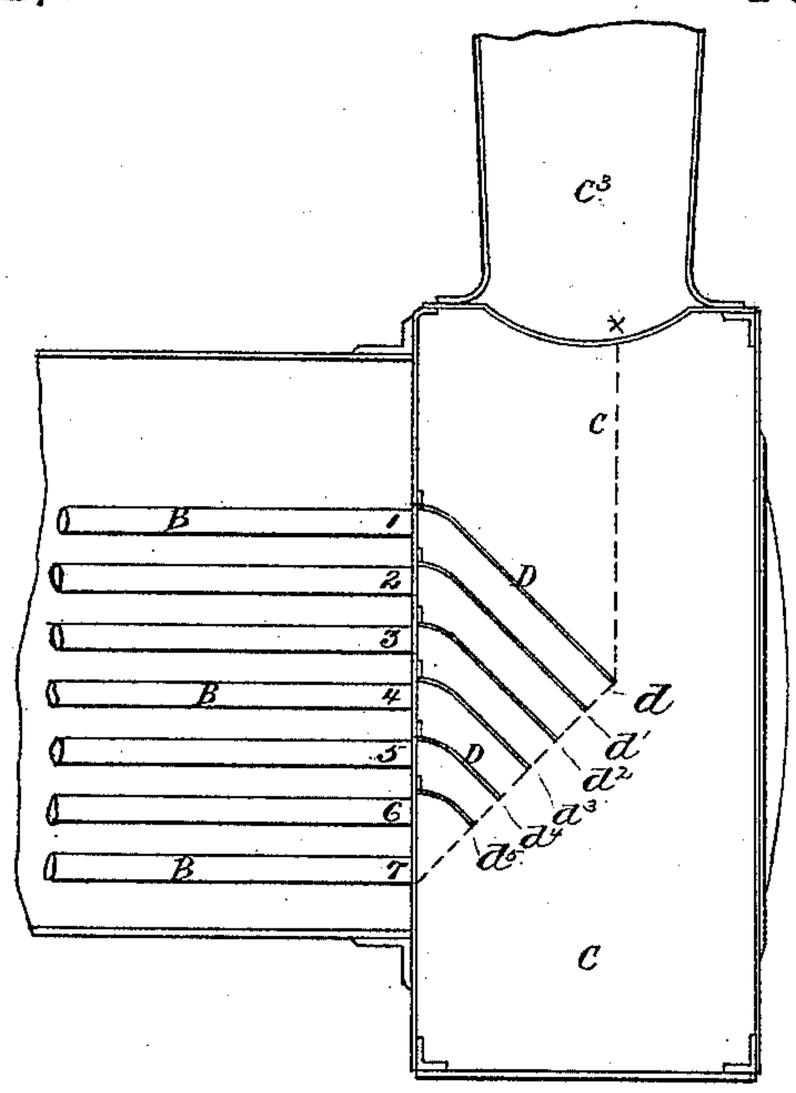


Fig: 4.

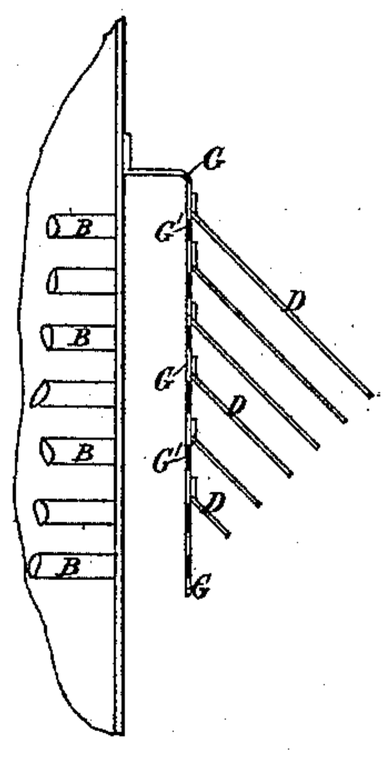


Fig: 5.

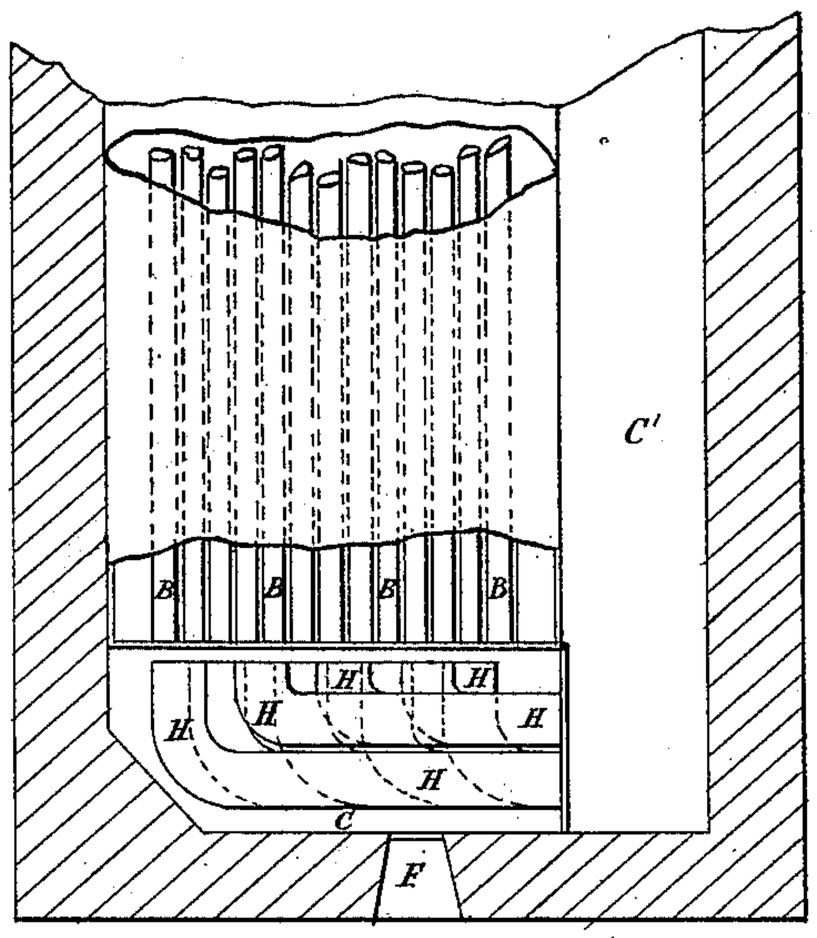


Fig: 7.

Attest:-
W. E. Coulter.
C. M. Gallaher.

Inventor.
Marie Augustin Despeissis
by Henry Orth.
Attorney.

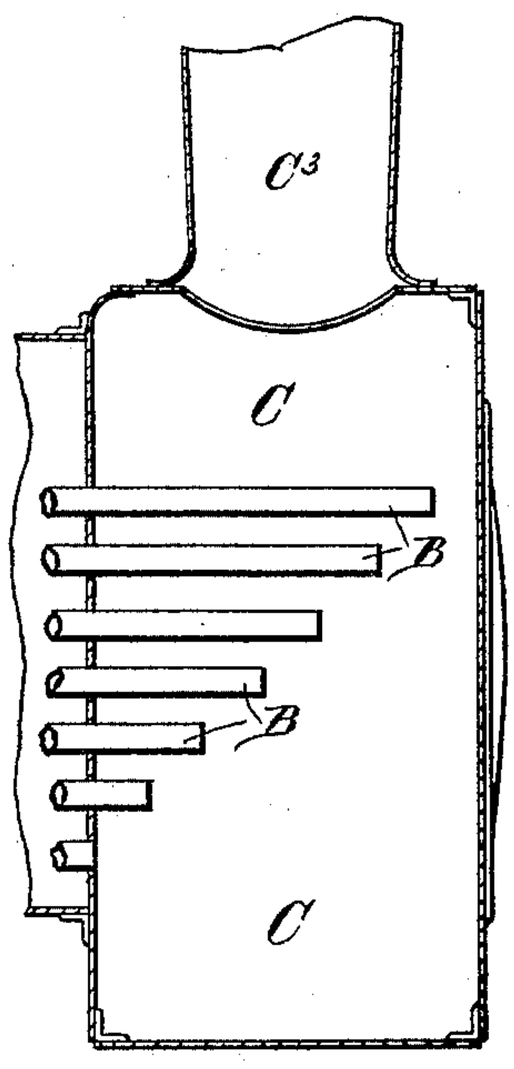
(No Model.) 4 Sheets—Sheet 4.

M. A. DESPEISSIS.

DRAFT REGULATOR.

No. 392,014. Patented Oct. 30, 1888.

Fig. 8



Witnesses:-
W. E. Foulter
D. McCallaher.

Inventor:-
Marie A. Despeissis.
by Henry Orth.
his atty.

UNITED STATES PATENT OFFICE.

MARIE AUGUSTIN DESPEISSIS, OF ST. KILDA, VICTORIA.

DRAFT-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 392,014, dated October 30, 1888.

Application filed September 15, 1887. Serial No. 249,795. (No model.) Patented in Victoria November 16, 1886, No. 4,813; in England February 25, 1887, No. 2,987; in New Zealand March 11, 1887, No. 2,254; in New South Wales August 2, 1887, No. 16; in France October 13, 1887, and in Queensland December 16, 1887, No. 316.

To all whom it may concern:

Be it known that I, MARIE AUGUSTIN DESPEISSIS, a French citizen, residing at Barkly Street, St. Kilda, in the British Colony of Victoria, have invented Improved Means for Creating an Even and Regular Draft through the Tubes or Flues of Steam-Boilers, (for which I have obtained Letters Patent in Great Britain, dated February 25, 1887, No. 2,987; in France, dated October 13, 1887, but unnumbered; in Victoria, dated November 16, 1886, No. 4,813; in New Zealand, dated March 11, 1887, No. 2,254; in New South Wales, dated August 2, 1887, No. 16, and in Queensland, dated December 16, 1887, No. 316,) of which the following is a specification.

This invention has for its object to provide means for creating an even and regular draft through the tubes of steam-boilers by causing the products of combustion from the furnace or fire-box to spread evenly and pass at a uniform rate through each and every one of the boiler-tubes, and to pass to the draft flue or stack at as nearly as possible the same moment, whereby an economy in heat is effected and the steaming power of the boilers is increased.

To these ends the invention consists in means for regulating the flow of the products of combustion according to the temperature thereof from the point of exit from the several tubes to the point of entrance of the draft flue or stack, and in structural features and combinations of parts, substantially as hereinafter described, and set forth in the claims. The above-described results are attained by making the distance to be traversed by the products of combustion through all the tubes from the point of exit therefrom to the point of entrance to the draft flue or stack substantially the same; but inasmuch as the products of combustion are not of the same temperature in all the boiler-tubes in multitubular boilers, the products escaping from the lower tubes being always of a lower temperature than those escaping from the upper tubes, it becomes necessary to correspondingly lessen the distance which the cooler products of combustion have to travel before reaching the entrance to the draft flue or stack. The difference is, however, a very small one, seldom more than an inch or two between the two extremes—that is, between the highest and lowest tube. Various means may be employed to attain the desired results, some of which will be described hereinafter, and are shown in the accompanying drawings, in which—

Figure 1 is a horizontal sectional view of so much of a multitubular stationary boiler as is necessary to illustrate my invention in its application to such boilers. Figs. 2 and 3 are like views of a portion of a twin tube and a Cornish boiler. Fig. 4 is a longitudinal sectional view of a portion of a locomotive-boiler, illustrating my improvements in their application to such. Fig. 5 is a sectional detail view illustrating a modification in the arrangement of the baffle-plates relatively to the boiler-flues. Fig. 6 is a longitudinal vertical section of so much of a stationary multitubular boiler with a return-draft flue as is necessary to illustrate the application of my improvements thereto; and Figs. 7 and 8 show by a horizontal and a vertical transverse section, respectively, a portion of a multitubular stationary and locomotive boiler, illustrating a modification in the means employed for attaining the results aimed at.

A simple mode of carrying out my invention is to form an extension at the end of the boiler-tube, where but one is used, so arranged at the exit end of said tube as to cause the products of combustion to traverse the same distance from any point at the exit end of the tube to the point of entrance or admission to the draft flue or stack. In multitubular boilers a plurality of such extensions may be provided, into which the boiler-tubes discharge the products of combustion. One such extension may be employed for one or more rows of boiler-tubes, and they may be arranged horizontally or vertically, according to the location of the draft flue or flues or stack; or they may be arranged at an angle to the longitudinal axis of the boiler-tubes, where the space in the smoke chamber or box does not admit of extending the tubes in a rectilinear direction. In either case diverting-flues are formed that increase the distance traversed by the products of combustion from the exit end of the tubes to the

draft flue or stack, and if this distance is properly regulated according to the distance of said exit end of the boiler-tubes to the point of entrance or admission to the draft flue or stack the products of combustion from all the tubes will enter the stack or draft-flue simultaneously, thus creating an even flow of the products of combustion and a uniform draft, whereby heat is economized and the steaming power of the boiler materially increased.

That my invention may be fully understood, I will describe the same in detail, referring to the drawings, and more particularly to Fig. 1.

A indicates the boiler; B, the boiler-tubes; C, the smoke box or chamber, and C′ the draft-flues arranged on opposite sides of the boiler and leading to the chimney.

D D′ indicate a series of baffle-plates secured to the end of the boiler and converging toward the center thereof, one such plate being interposed between each two rows of boiler-tubes. The plates are arranged vertically, for the reason that the draft-flues are located on opposite sides of the boiler, and said plates extend from the bottom to the top of the smoke box or chamber C, thus forming diverting-flues for each row of tubes. The width of the plates is so regulated that the distance traveled by the products of combustion from the end plate of the boiler to a point which may be called the "entrance" to the draft-flues is the same for all the boiler-tubes, the said distance being, if anything, shorter for the lower boiler-tubes, for the reason, as hereinabove stated, that the temperature of the products of combustion passing through the lower boiler-tubes is not as high as that of the products of combustion passing through the upper boiler-tubes, and consequently do not travel as fast as the more highly-heated products of combustion.

As shown, the baffle-plates D form vertical flues or passages for each vertical row of boiler-tubes that converge toward the center of the boiler, said passages decreasing in width toward that point. The point of admission of the products of combustion to the draft-flues C′ may therefore be considered as located at *d*, or along the outer edge of the outer wider baffle-plates, D. The distance to be traversed by the products of combustion from the outer vertical row of tubes is therefore from 1 to *d*, while the distance traversed by the products of combustion from the next row of tubes is from 2 to *d′* to *d*, which distance is equal to $1+d$. The distance traversed by the products of combustion from the next row of tubes is from 3 to d^2 to *d*, which is also equal to the distance 1 *d*, and, finally, the distance traversed by the products of combustion passing through the central row of tubes is from 4 to *d* along the edges of the baffle-plates, and is equal to the distances $3\ d^2+d^3\ d$, $2\ d'+d'\ d$, and 1 *d*, respectively, so that the products of combustion from all the boiler-tubes travel the same distance before their entrance into the draft-flues, and are admitted to said flues simultaneously.

The distance to be traversed by the products of combustion may be varied within certain limits by making the baffle-plates simultaneously adjustable, as shown in Fig. 1, in which all the baffle-plates, and on opposite sides of the boiler-center, are connected to a rod, E, said plates being hinged to the boiler-flue plate.

In Fig. 2 I have shown the invention applied to a boiler having but two fire-tubes, and in Fig. 3 I have shown it as applied to a Cornish boiler, the baffle-plate being of masonry-work. In either case the baffle-plates project over the flue to a point in the plane of the vertical diameter thereof, to divert one-half of the products of combustion and cause them to traverse the same distance as the remainder of said products.

In Fig. 4 I have shown the invention in its application to a locomotive-boiler, and here we may admit the point of entrance to the stack to be at X, and it will be seen that the distance traversed by the products of combustion from the point 7 to *d* and X is equal to the distance from 1 to $d+d\,X$, or from 4 to $d^3+d^3\ d+d\,X$, or from 6 to $d^5+d^5\ d+d\,X$, and so on. These baffle-plates may also be made adjustable by hinging them to the boiler-flue plate and connecting them to a manipulating-rod, as described in reference to Fig. 1.

The devices may be made to perform the function of a spark-arrester by connecting the baffle-plates to a casing, G, open at its lower end and having openings G′ in front of each boiler-tube, leading to the passages formed by the baffle-plates D, as shown in Fig. 5, the solid or incandescent matter being projected by the draft against the inner face of the casing, or against the baffle-plates, should such incandescent matter pass through the openings G′ in the casing. To prevent the latter, a wire-gauze or other like foraminous material may be applied over the openings G′ and secured to the inner face of casing G; or said wire-gauze may be applied to the outer end of the baffle-plates.

In Fig. 6 I have shown the invention in its application to a stationary boiler in which the smoke-box is connected to a return-draft flue. In Fig. 7 the same results are attained by means of pipes, the aggregate area of which is equal to the aggregate area of the boiler-tubes, all of said pipes terminating at one end at the point of entrance to the draft-flue and at the other within a few inches of the end of the boiler-tubes, the pipes varying in length, so that the distance traveled by the products of combustion from the point of exit from the boiler-tubes to the point of entrance to the draft-flue will be the same for all the tubes. In Fig. 7 I have shown the flues themselves extended into the smoke-box to produce the same results.

Instead of connecting the baffle-plates to the flue-plate of the boiler, they may be connected to the smoke-box door when practicable.

Having described my invention, what I claim is—

1. In a steam-boiler, the combination, with the draft flue or stack and the boiler-tube, of a diverting-flue at the exit end of said tube, arranged to divert a portion of the products of combustion issuing therefrom, the degree of diversion varying with the distance between the points of exit of the products of combustion and the draft flue or stack, substantially as and for the purposes specified.

2. In a multitubular steam-boiler, the combination, with the draft flue or stack and the boiler-tubes, of a diverting-flue for one or more rows of tubes at the exit end thereof, the length of which flues varies with the distance between said exit end of the tubes and the entrance to the stack, and according to the velocity of the flow of the products of combustion through said tubes, substantially as and for the purposes specified.

3. In a steam-boiler, the combination, with the stack and the boiler-tubes, of a diverting-flue for one or more rows of tubes at the exit end thereof, and a collecting-chamber open at bottom interposed between the tube ends and the flues and provided with openings leading into the diverting-flues, said flues varying in length according to the distance from the exit end of the boiler-tubes to the entrance of the stack, and according to the velocity of the flow of the products of combustion through said tubes, substantially as and for the purposes specified.

4. In a steam-boiler, the combination, with the stack and the boiler-tubes, of adjustable diverting-flues at the exit end of the boiler-tubes, said diverting-flues varying in length in proportion to the distance between said exit end of the boiler-tubes and the entrance to the stack, and according to the velocity of the flow of the products of combustion through said tubes, substantially as and for the purposes specified.

MARIE AUGUSTIN DESPEISSIS.

Witnesses:
EDWARD WATERS,
WALTER SMYTHE BAYSTON.