

No. 791,314.

PATENTED MAY 30, 1905.

J. D. BOWNE.  
WATER TUBE STEAM BOILER.  
APPLICATION FILED JULY 5, 1904.

Fig. 2

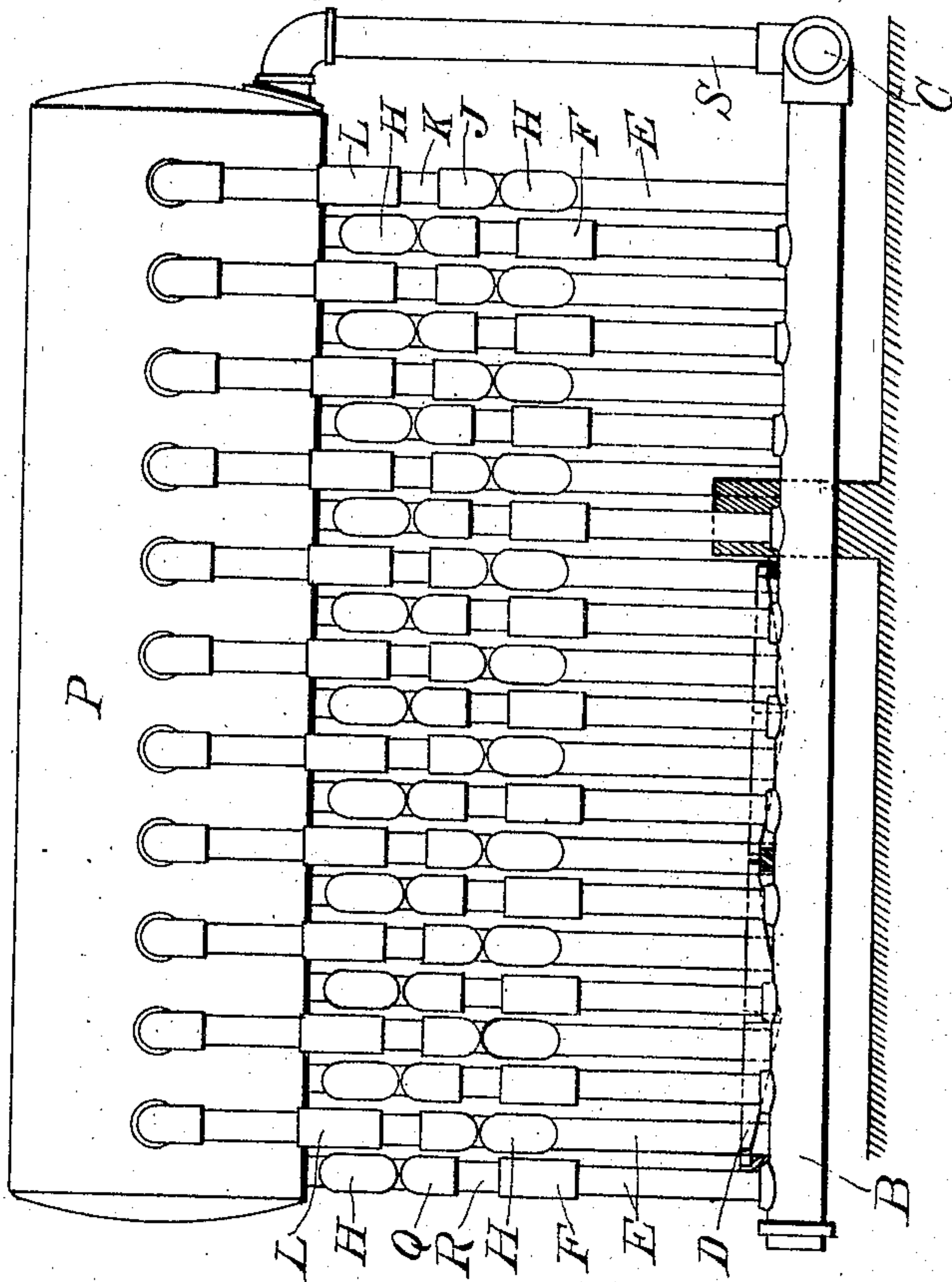
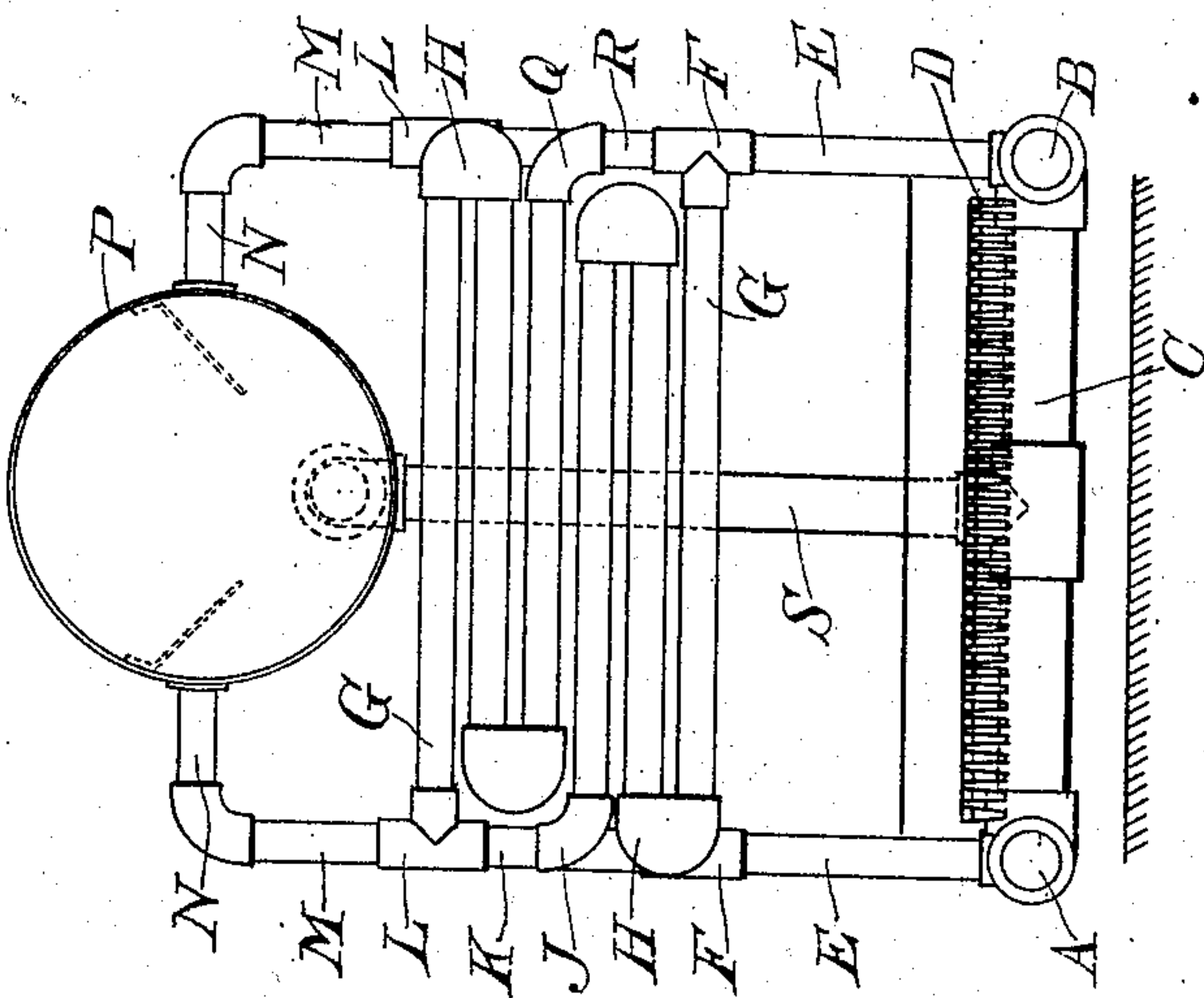


Fig. 1



Witnesses  
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# UNITED STATES PATENT OFFICE.

JOHN D. BOWNE, OF NEW YORK, N. Y.

## WATER-TUBE STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 791,314, dated May 30, 1905.

Application filed July 5, 1904. Serial No. 215,260.

*To all whom it may concern:*

Be it known that I, JOHN D. BOWNE, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Water-Tube Steam-Boilers, of which the following is a specification.

My invention relates to water-tube steam-boilers—that is to say, it belongs to the general class of steam-generators wherein the water is subjected to the heat of the furnace while circulating through series of tubes.

Among the numerous boilers possessing the structural nature stated there are many in which the tubes are disposed substantially in vertical and horizontal attitudes, and numerous examples comprise series each having a single perpendicular tube or riser connected to a plurality of horizontal tubes. In this manner many tubes are arranged directly across the path of the hot products of combustion from the furnace and the heating-surface increased so far as may be deemed desirable just where the heat is most effective. The risers are not directly subjected to the current of the burning gases, and a single riser is made to serve several cross-tubes. Obviously the circulation in the single vertical tube is more rapid than in the several cross-tubes, the greater area of the combined horizontal tubes enabling the water to move more slowly, thus giving more time for the heat to be taken up. It is to this last variety or type of water-tube boiler that my invention particularly belongs, and the object of the invention is to produce a special arrangement of the tubes that will afford large direct heating-surface for minimum weight and number of tubes.

I accomplish the object set forth by forming and associating the parts as illustrated in the accompanying drawings, of which—

Figure 1 represents a front end view or elevation, and Fig. 2 a side view.

Like letters are used to refer to the same parts throughout the drawings.

The base of my invention upon which the various parts are erected and by which the whole structure is supported consists of heavy trunk-pipes A and B, arranged parallel to each

other and connected at the rear by a shorter but similar pipe C, the three pipes constituting the three sides of a rectangle. A suitable grate is designated by the letter D.

The trunk-pipes A and B are manifolds and each possesses a row of threaded openings into which are screwed the risers E. The series of tubes are arranged one in rear of the other, and assuming the first riser E to be connected with trunk or base manifold B the riser of the next succeeding series will be coupled with trunk or base manifold A on the opposite side of the boiler. As each series of tubes is precisely the same in construction as all the others, an explanation of the first series will cover any number used. At a suitable distance above the grate D the first riser E will be seen to engage a T, (marked by letter F.) The T is connected with a series of horizontal tubes G, the ends of which are connected with each other by return-bend caps H. In Fig. 1 of the drawings the horizontal tubes form a flattened S, but I do not limit myself to three horizontal tubes in each horizontal series, as a greater number of tubes G may clearly be employed. The uppermost tube G of the lower S-shaped series is connected by way of an elbow J and short tube K through an upper T (marked L) and thence by vertical and horizontal tubes M and N with the drum P.

The upper T, (marked L,) it will be noted, is found upon the opposite side from that of the lower T (marked F) of the series of tubes, and a second and upper S-shaped series of horizontal tubes G is connected with the upper T. The lower tube G of the upper S-shaped series of horizontal tubes is coupled by way of the elbow Q and a short tube R with the lower T (marked F) and already referred to.

At the rear the drum is connected with the cross-pipe C by the circulation-pipe S, vertically disposed.

In operation the water rises from the side base manifolds A and B, flowing rapidly through the risers E and upper tubes M and N; but relatively slowly through the horizontal tubes G, wherein it is exposed to the hot gases from the furnace, heat from which it

takes in to the maximum extent. After passing through the drum the water is returned at the rear by way of circulation-pipe S.

Having thus described my invention, the  
5 special arrangement of tubes in a water-tube boiler claimed by me is—

In a water-tube steam-boiler, the combination with a steam-drum, of base trunk-pipes, an upper vertical tube upon one side of the  
10 boiler connected with said drum, a lower vertical tube upon the opposite side connected with one of said base-pipes, an upper series of horizontal tubes connected at one end with an intermediate point of said upper ver-

tical tube and at the remaining end with the 15 uppermost extremity of said lower vertical tube, and a lower series of horizontal tubes connected at one end with an intermediate point of said lower vertical tube and at the remaining end with the lowest extremity of 20 said upper vertical tube.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN D. BOWNE.

Witnesses:

AUG. T. WILLINK,  
C. E. GOOGINS.