

(No Model.)

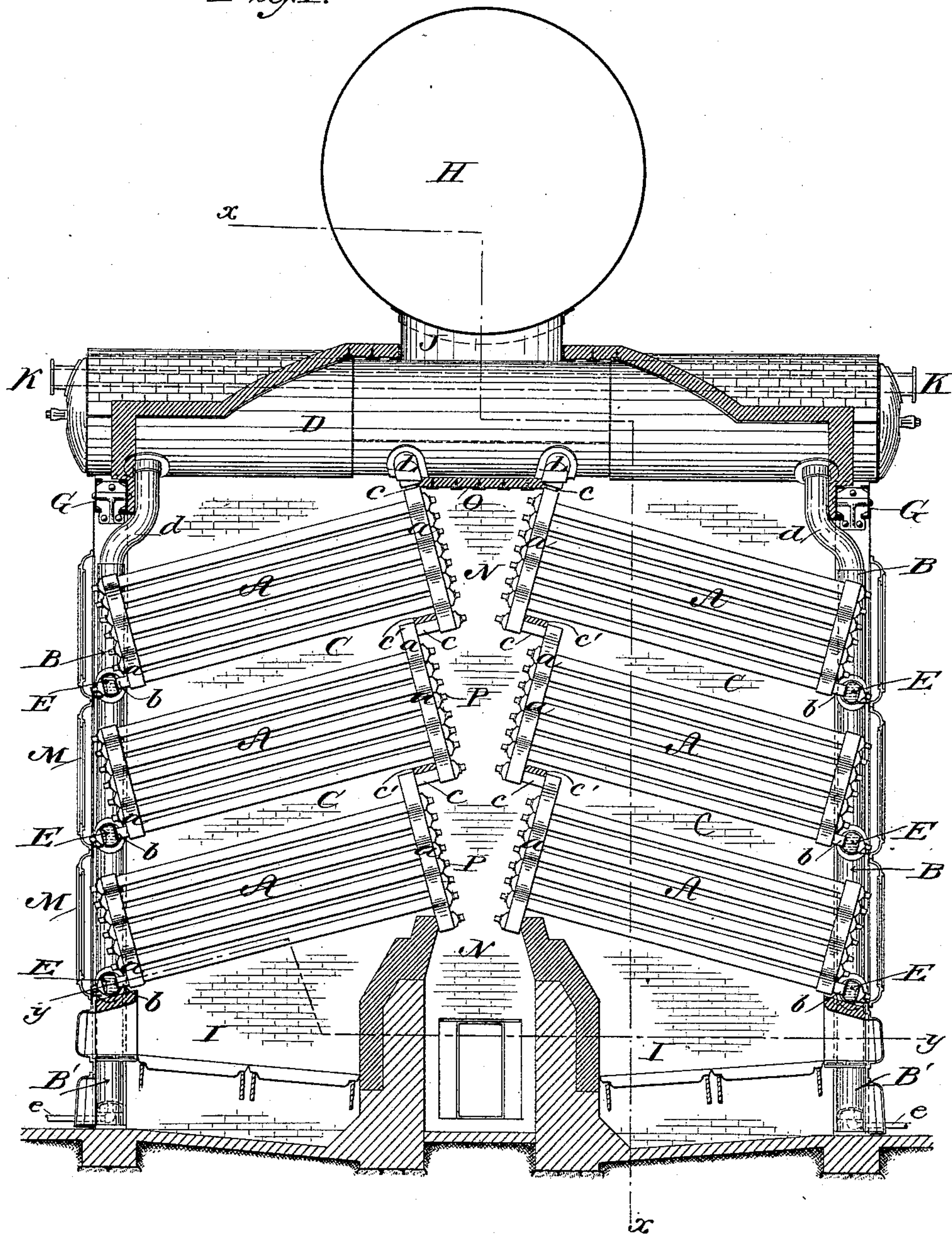
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N. W. PRATT.  
STEAM GENERATOR.

No. 428,632.

Patented May 27, 1890.

*Fig. 1.*



WITNESSES.

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INVENTOR.

*Nath W. Pratt*

*Wm Chas N. Forbes*

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(No Model.)

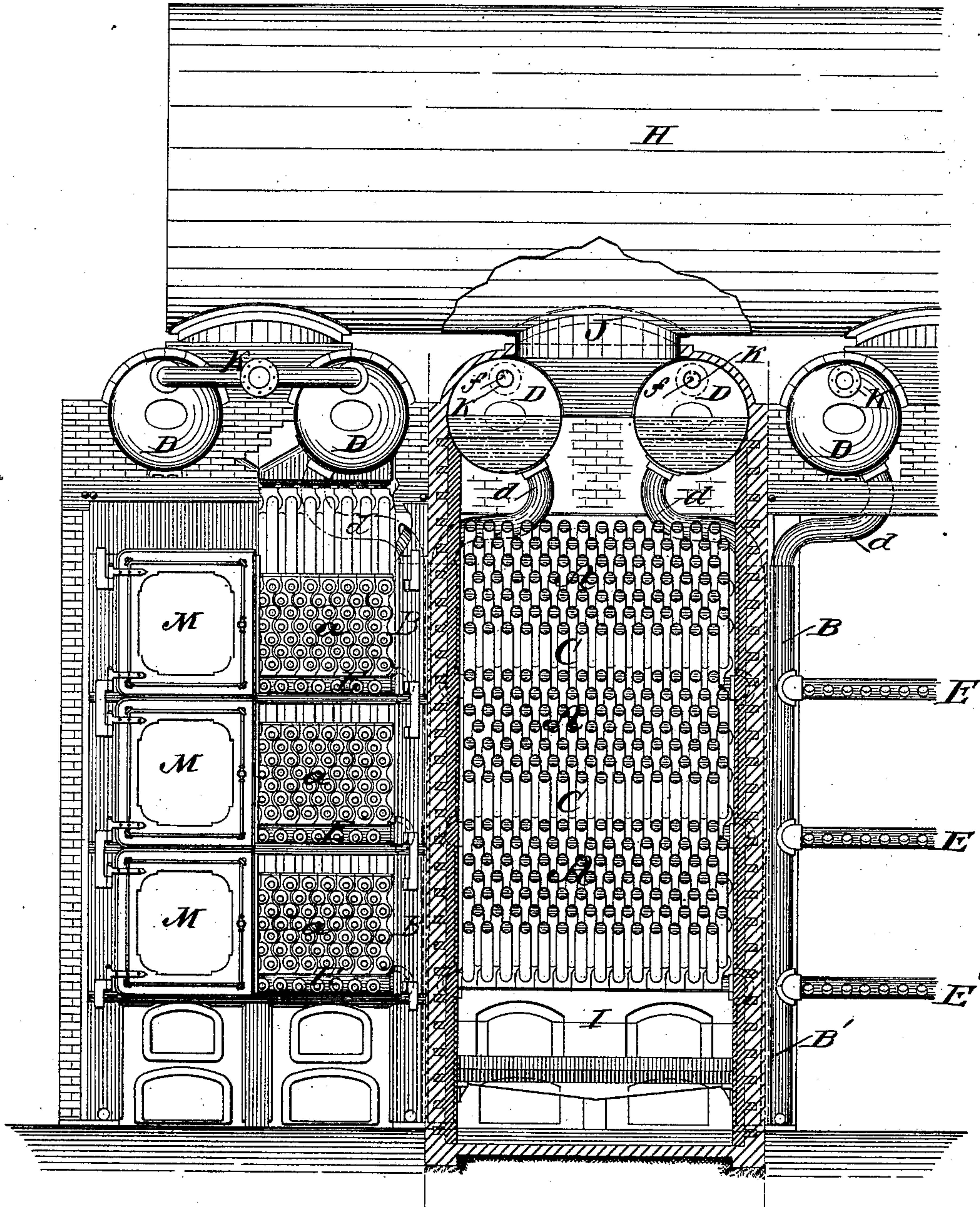
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*Fig. 2.*



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(No Model.)

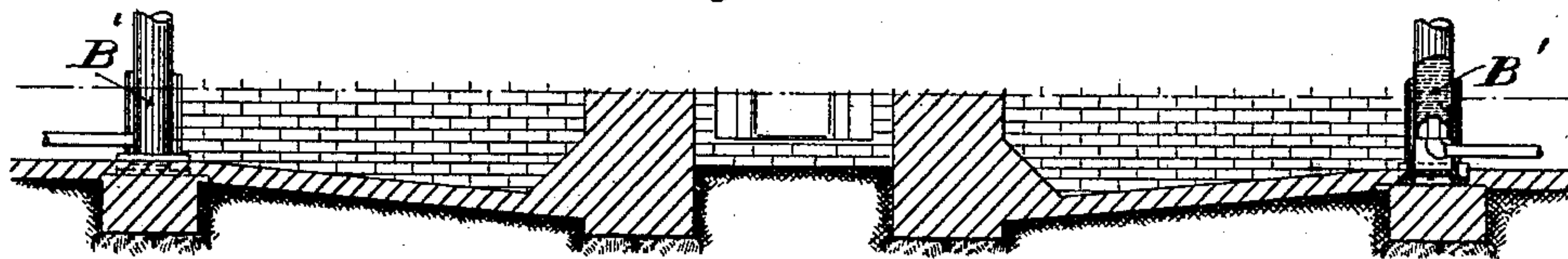
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N. W. PRATT.  
STEAM GENERATOR.

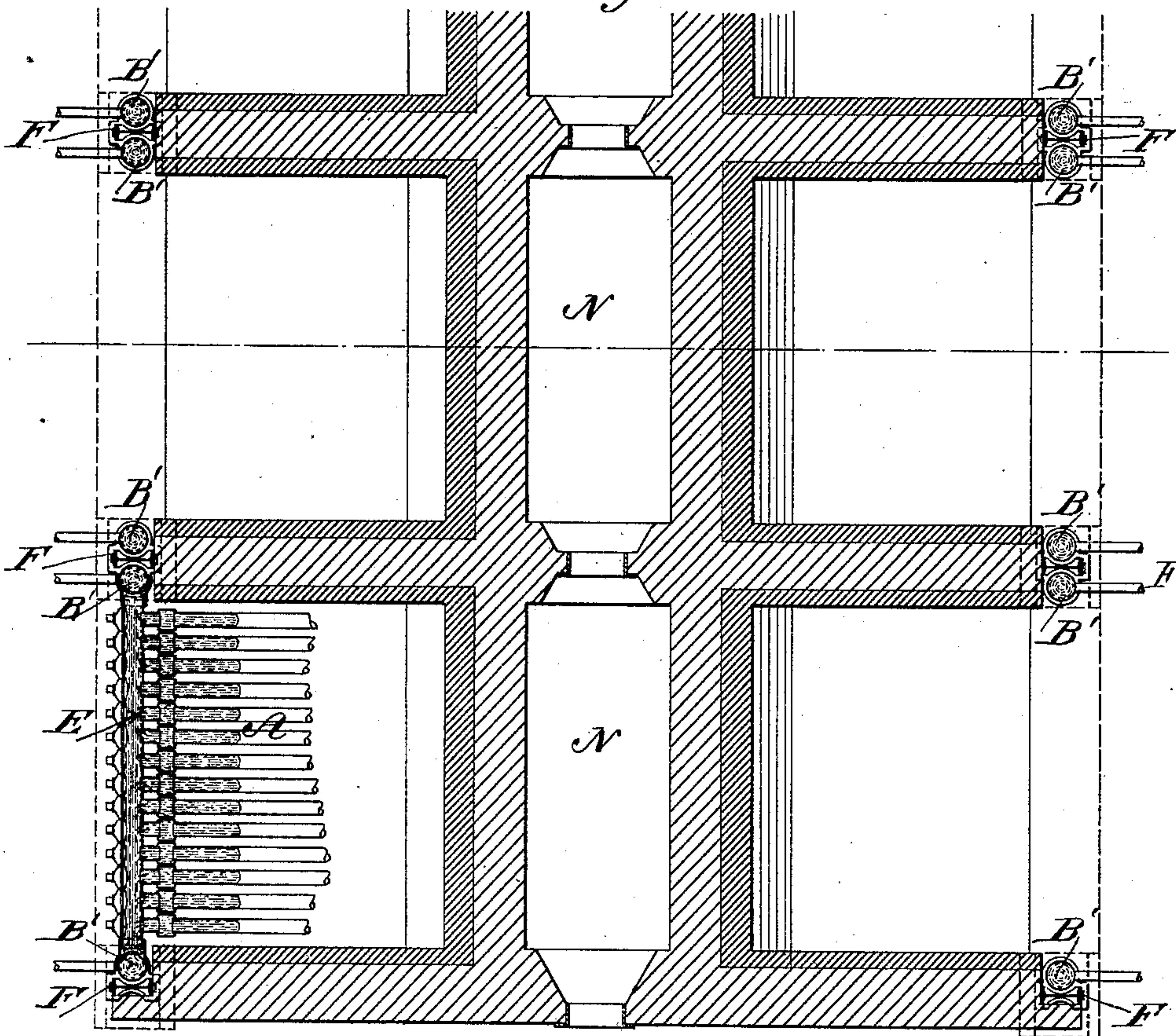
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*Fig. 3.*



*Fig. 4.*



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# UNITED STATES PATENT OFFICE.

NAT. W. PRATT, OF BROOKLYN, NEW YORK.

## STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 428,632, dated May 27, 1890.

Application filed January 28, 1888. Serial No. 262,211. (No model.)

*To all whom it may concern:*

Be it known that I, NAT. W. PRATT, a citizen of the United States, residing at Brooklyn, county of Kings, State of New York, have  
5 invented certain new and useful Improvements in Steam-Generators, of which the following is a specification.

In order that others may understand and use my invention, I will first proceed to describe a structure embodying it, and subsequently will point out in the claims its novel characteristics.

Referring to the accompanying drawings, in which corresponding letters indicate like  
15 parts, Figure 1 is a longitudinal vertical section of a battery of boilers constructed according to my invention; Fig. 2, a front elevation, partly in section, on the line  $x x$ , Fig. 1; Fig. 3, a longitudinal vertical section of  
20 the lower portion of the foundation; and Fig. 4, a ground plan of the foundation, taken partly in section, on the line  $y y$ , Fig. 1.

A A A are groups of generating water-tubes, all connecting vertically by serpentine headers  $a$  at each end thereof, and by means of  
25 nipples  $b$  and  $c$ , respectively, with the connecting-boxes E of the water-columns B and the drum manifolds L of the drums D.

C C are the combustion spaces or chambers  
30 between the said groups of generating-tubes. The serpentine headers  $a$  interlock, as seen in Fig. 2, and form walls within which the draft-course is confined, the spaces between the nipples  $c$  being closed by fire-brick filling  
35  $c'$ , or in the instance of the outer ends of the structures the draft being confined by the boiler-fronts and doors M. The tubes A are inclined in the manner common to boilers of this class, so that upward circulation is pro-  
40 moted by the heat, delivering the current from the tubes through the central assemblage of headers  $a$  to the mid portion of the drum or drums D, and thence downward through the water columns or legs B. The space or cham-  
45 ber N intermediate to the sections is cut off from the draft-flue and combustion-chambers by the fire-brick partition O, and serves the purpose of access to the hand-holes P, opposite the tubes, whereby the same may be  
50 cleaned or repaired. The drum D, I prefer to make continuous over the sets of groups of

tubes set at opposite angles. Each series of groups I provide with a separate furnace I, each of which communicates with the common smoke-flue H. The water-legs B act as  
55 supports for the outermost ends of the tubular structures, and the drums D are supported on the foundation by the vertical I-beams F and cross-beams G. The differences of expansion between the vertical water-legs B and  
60 beams F are yielded to by the offset curvatures or necks  $d$  in said water-legs, which by the ductility of the metal will bend to the limited degree required and avoid lifting or disturbing the drums from their fastenings. The  
65 water-legs B are adapted by their large diameter and lower extensions B' below the point of final water-circulating delivery (through connecting-boxes E') to separate the heavier impurities by gravity at each downward cir-  
70 culation of the water after passage through the generating portions of the boiler. The said extensions B' act as sediment-repositories, wherefrom the accumulations are occasionally (or continuously) withdrawn by  
75 means of suitable blow-off pipes  $e e$ . The feed-water is admitted to the lower portions of the drums D by pipes (not shown) and the generated steam delivered by pipes K, which  
80 latter extend through the drums and are adapted by openings at their upper sides, as at  $f$ , Fig. 2, to avoid priming.

H is the horizontal draft-flue conducting to the smoke-stack or chimney. The draft passes from the furnaces I continuously upward and  
85 directly out between the drums and through connections J to the flue H.

The construction shown is manifestly adapted to a battery of boilers to any desired capacity or to a single boiler, and the combustion-spaces may be employed in any number  
90 other than that shown. The volume which the spaces C should have is governed by the number of tubes intervening, and, furthermore, the volume of the said spaces relatively  
95 to each other may be varied—as, for instance, in diminishing order—according to remoteness from the furnace.

It is evident that one half the boiler shown may be used alone without changing the char-  
100 acter of the invention, or that the combination of two such independent halves would

be the exact equivalent of the construction herein shown, as it is not necessary for the success of the invention that the drum D should be continuous.

5 Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a water-tube steam-boiler, the combination of a series of groups of inclined tubes  
10 arranged at opposite inclines, a drum or drums above and connected with said tubes, a series of furnaces communicating with a common smoke-flue, and a common chamber between the groups of tubes, substantially as herein  
15 specified.

2. In a water-tube boiler, the combination of a series of groups of inclined tubes arranged at opposite inclines, a series of furnaces connecting with a common smoke-flue,

and a common chamber between the groups  
20 of tubes, substantially as herein described.

3. As a structure for a sectional water-tube steam-generator, the combination, with a group or vertical succession of groups of inclined generating-tubes, the horizontal steam-  
25 receiving drum or drums above said tubes having fixed support, as by vertical and transverse beams F and G, of the yielding water-leg connections, as having curved necks *d*, and transverse connecting-boxes, as E, adapt-  
30 ed to support and connect with the lower ends of said inclined tubes and to connect with said fixed drums irrespective of expansion or contraction of said water-legs.

NAT. W. PRATT.

Witnesses:

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CHAS. L. MOELER.