

(No Model.)

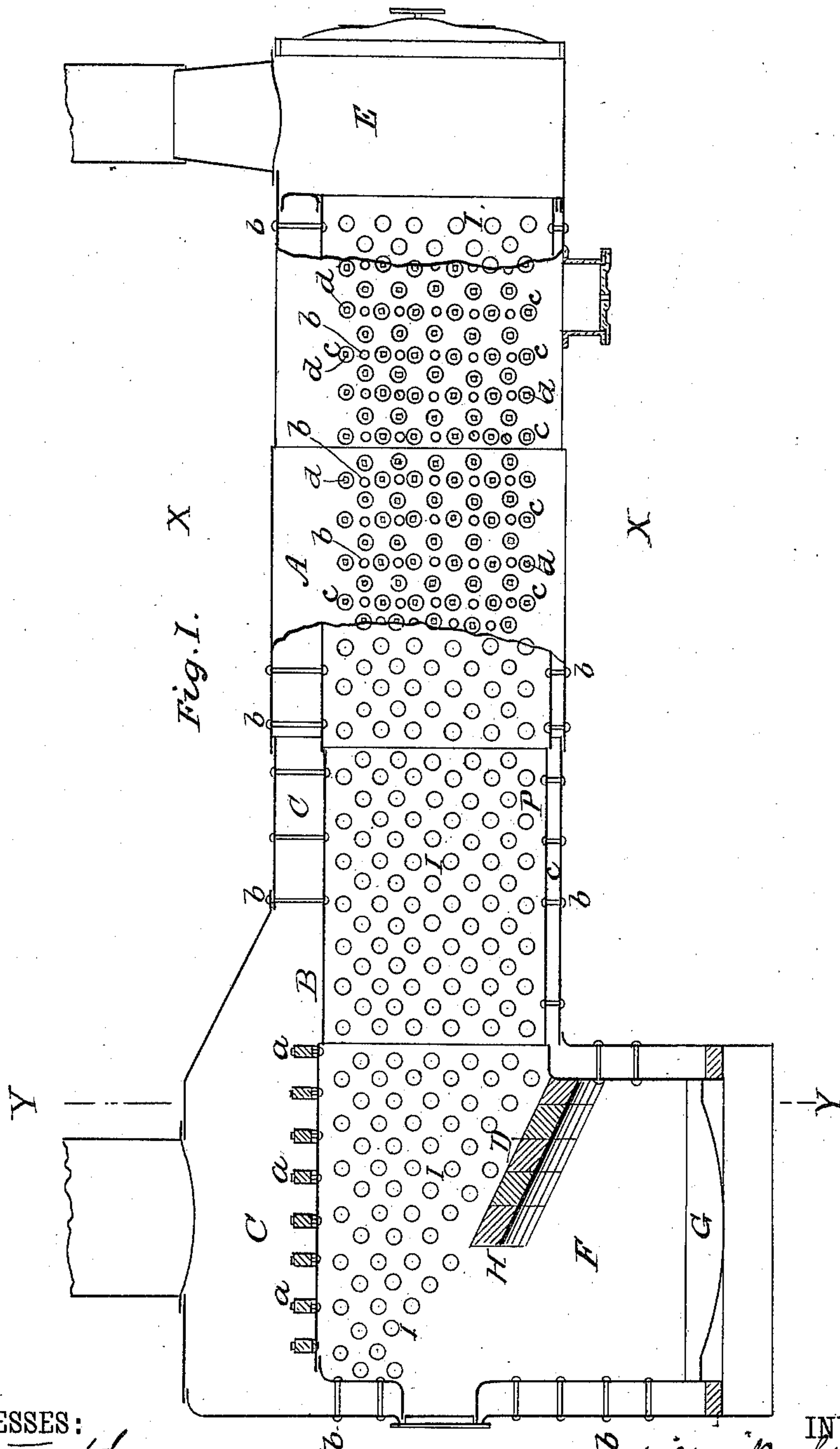
2 Sheets—Sheet 1.

M. W. HAZELTON.

LOCOMOTIVE BOILER.

No. 311,318.

Patented Jan. 27, 1885.



WITNESSES:

Stewart
Albert P. Moriarty.

INVENTOR

Milton M. Hazleton

BY

Samuel S. Storer

ATTORNEY

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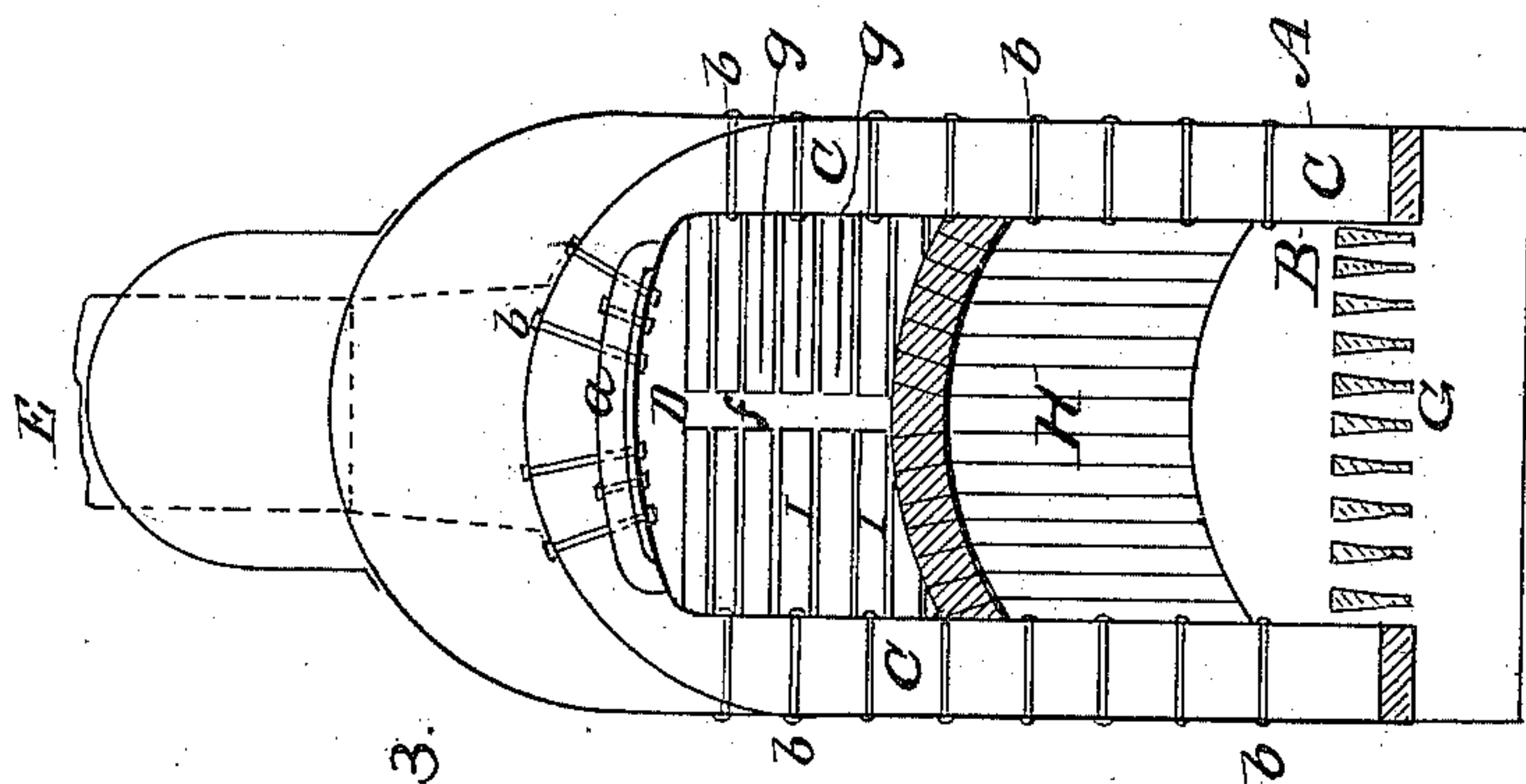


Fig. 3.

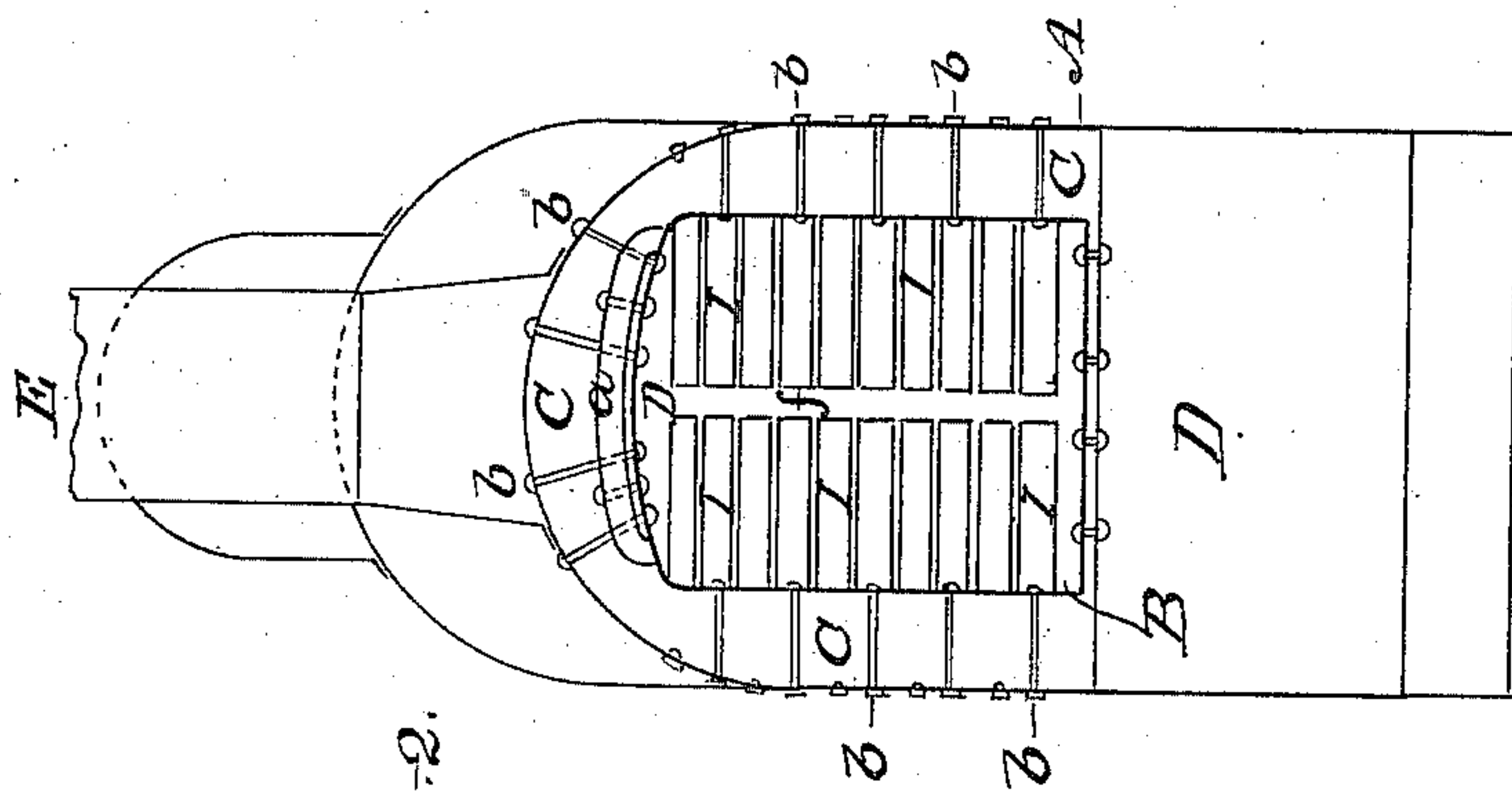


Fig. 2.

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UNITED STATES PATENT OFFICE.

MILTON W. HAZELTON, OF CHICAGO, ILLINOIS.

LOCOMOTIVE-BOILER.

SPECIFICATION forming part of Letters Patent No. 311,318, dated January 27, 1885.

Application filed April 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, MILTON W. HAZELTON, a citizen of the United States of North America, and a resident of Chicago, county of Cook, State of Illinois, have invented a new and useful Improvement in Locomotive-Boilers, of which the following is a specification.

This invention relates to improvements in boilers of the locomotive type, and has for its objects the increase of heating-surface and the quick generation of steam.

The invention consists in making the combustion-chamber extend the whole length of the boiler, in constructing the boiler with double shell, with water-tubes instead of hot-air flues, and in arranging said tubes transversely across the boiler, projecting inward horizontally from and communicating with the side water-spaces.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a longitudinal partly-sectional side elevation of my improved boiler with parts broken away to exhibit other parts. Fig. 2 is a cross-sectional elevation on line *x x*, Fig. 1. Fig. 3 is a cross-sectional elevation on line *y y*, Fig. 1.

In my improved locomotive-boiler the shell is made double throughout from the front to the uptake *E*, the space *C* between the outer shell, *A*, and the inner shell, *B*, being the water-space. The combustion-chamber *D* also extends from the front of the boiler to the uptake, as shown, the fire-box *F* being the space between the grate-bars *G* and the deflecting-plate *H*. The shells *A B* are designed to be suitably stayed by stay bars and bolts *a b*, respectively, and the shell-sections are to be riveted together in the usual manner. The water-tubes *I*, whose inner ends are closed, project into the combustion-chamber *D* from both sides, being inserted through corresponding holes in the inner shell, *B*, and being retained therein by having their open ends expanded. Opposite the tube-holes in the inner shell, *B*, holes *c* are made in the outer shell, *A*, through which the expanding-tool is passed for expanding the tubes in place, and

after the latter are in position and the expanding-tool is withdrawn these holes *c* are closed by plugs *d*, as shown. All the tubes *I* projecting from the opposite sides of the boiler are made of such a length that a space, *f*, extending the whole length of the combustion-chamber is left between the ends of those on one side and those on the other side, in order that the hot air and gases from the fire-box may have more free circulation, and that the contraction and expansion of the tubes shall not affect the boiler-shell, as would be the case if the tubes were continuous from side to side. These tubes *I* may also be provided with longitudinal diaphragms, as indicated at *g*, which will cause the water to pass over a large surface in each tube, as it will pass into it below the diaphragm and leave it above, thus creating a rapid circulation, which will not only keep the tubes clear from sediment, but will compel the water in each tube to pass from one end to the other, and thus all the water in said tube will pass successively over the hottest part thereof.

In constructing my improved locomotive-boiler for burning anthracite coal, I place tubes *I* directly above the fire-box, as shown, and protect the same from the intense heat of combustion by the deflector *H*; but in a locomotive-boiler designed for burning wood or bituminous coal I dispense with the water-tubes just above the fire-box, so that a larger uninterrupted combustion-room is afforded.

The tubes *I* may be set in horizontal planes one above another, or may be set staggering, as may be desired, and in either case they present a much more extended heating-surface than is found in the ordinary locomotive flue-boiler, and they present the water to the effect of the products of combustion in so subdivided a condition that steam can be most rapidly generated in them.

It is not believed that the objects of extensive heating-surface and quick steaming in a boiler can be more fully attained than with a boiler having flat sides and transverse water-tubes, as herein shown.

I am aware of the English Patent No. 13,843 of 1851, covering various boiler constructions, and that "drop-tubes" or water-tubes extend-

ing part way into a combustion-chamber have been used in boiler construction, and hence do not broadly claim them; but,

Having thus described my invention, I claim
5 as new and desire to secure by Letters Patent—

A boiler of the locomotive type, consisting of the following elements: inner and outer shells, B and A, firmly stayed by bars *a* and bolts *b*, tubes I, rigidly attached to the shell B,
10 and extending inwardly therefrom into the combustion-chamber, leaving a space, *f*, between their free ends, and a clear space above said tubes and between the same and the top of the shell B, openings *c* in the outer shell coincident

with said tubes I, plugs *d*, closing the same, 15 and the deflector H, protecting the tubes immediately over the fire-chamber F, the parts being combined, arranged, and operating substantially as and for the purposes specified.

In testimony that I claim the foregoing as 20 my invention I have signed my name, in presence of two witnesses, this 18th day of April, 1884.

MILTON W. HAZELTON.

Witnesses:

H. C. GOULDING,
L. HAYNES.