

(No Model.)

W. STEPHENSON.

BOILER AND STRAW BURNING FURNACE.

No. 310,740.

Patented Jan. 13, 1885.

Fig. 1.

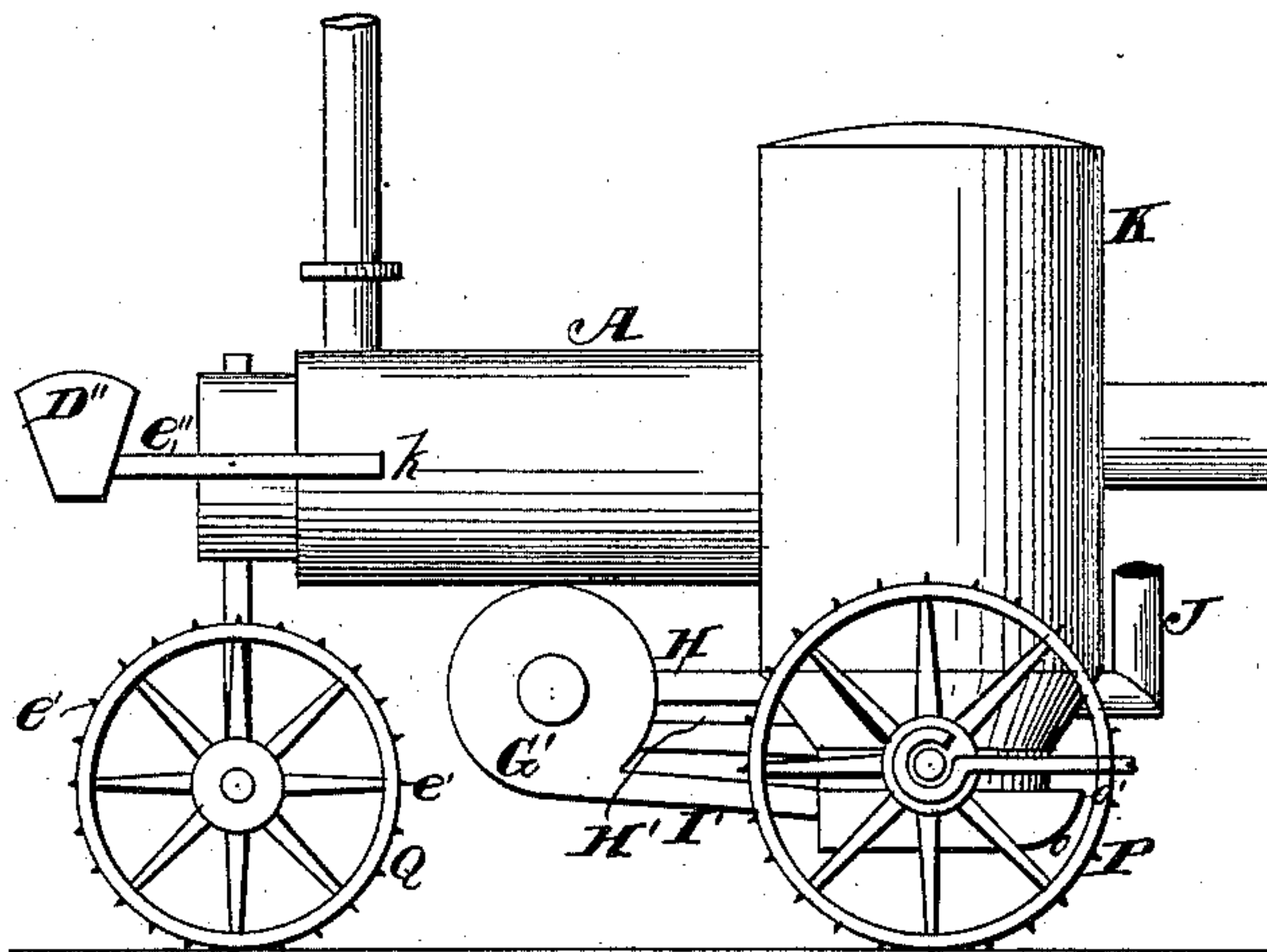


Fig. 2.

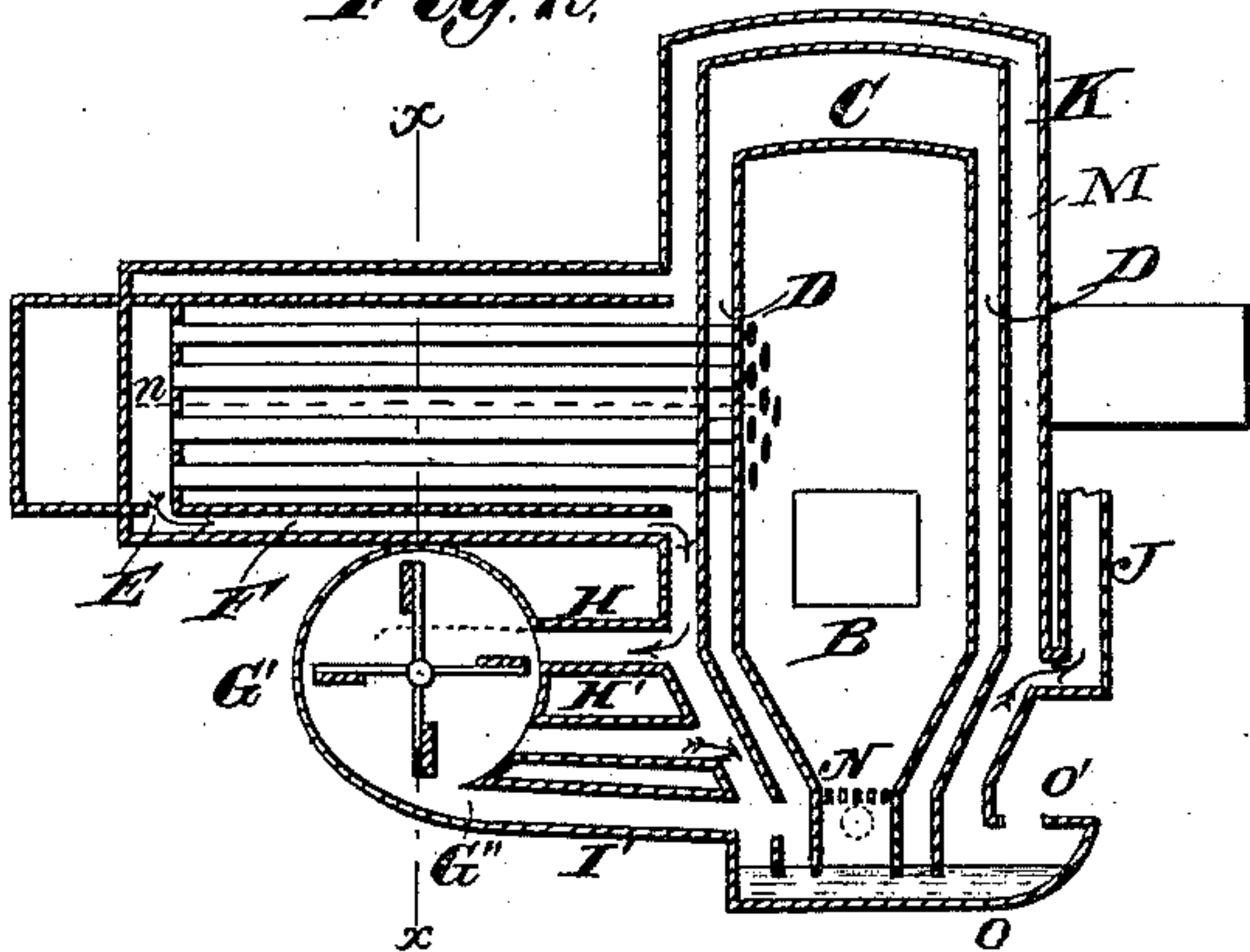


Fig. 3.

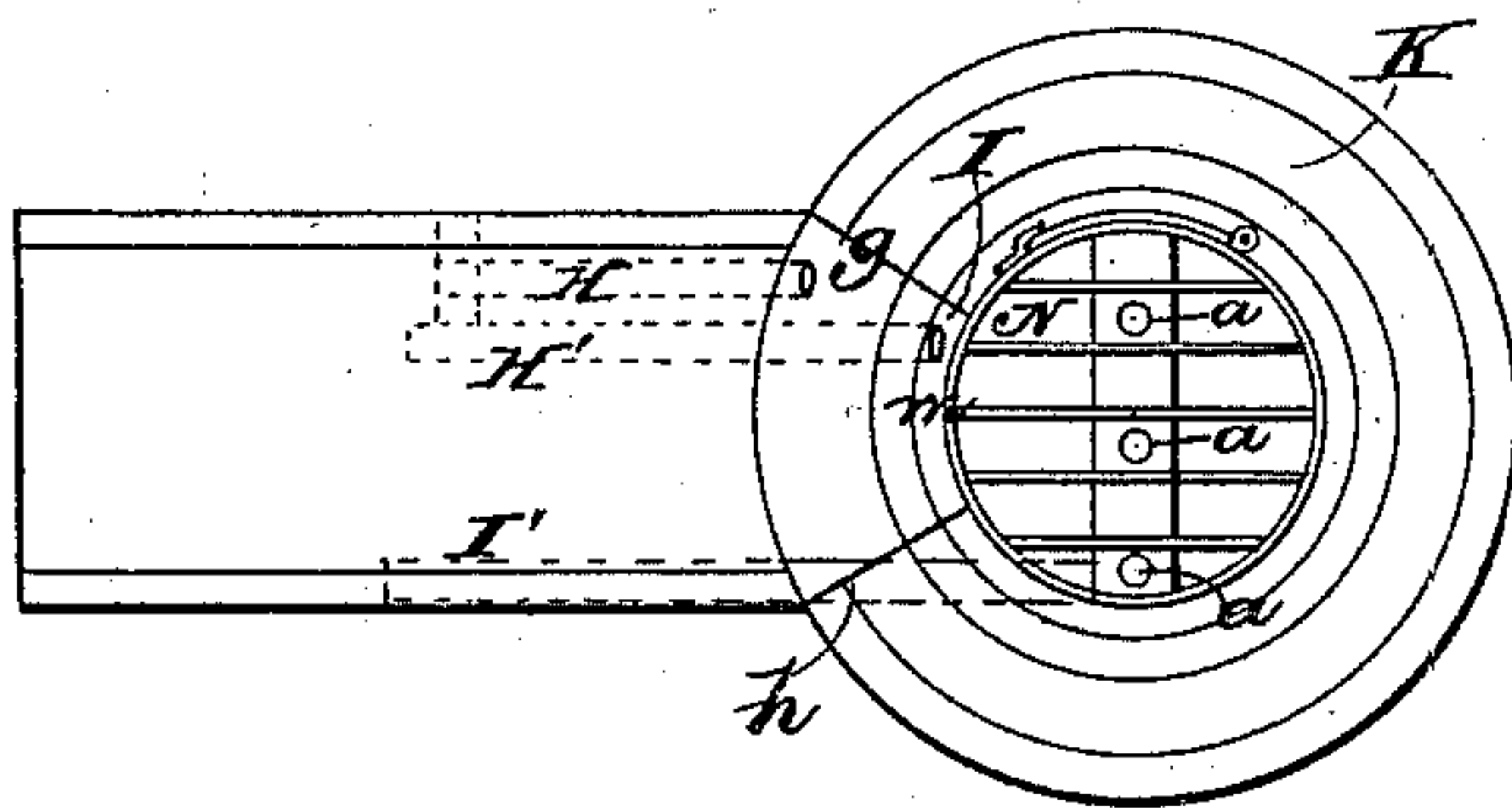


Fig. 4.

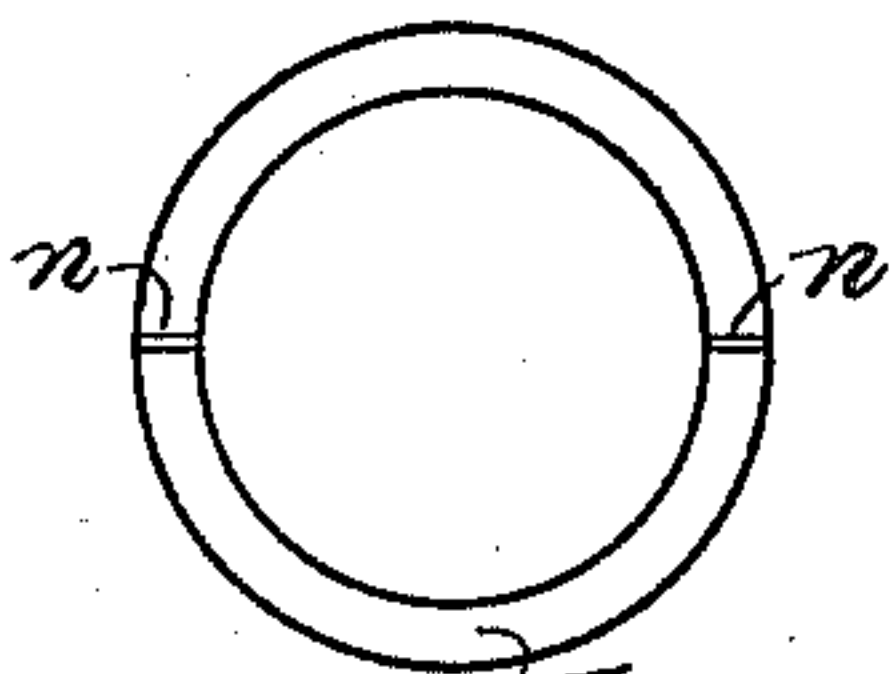


Fig. 6.

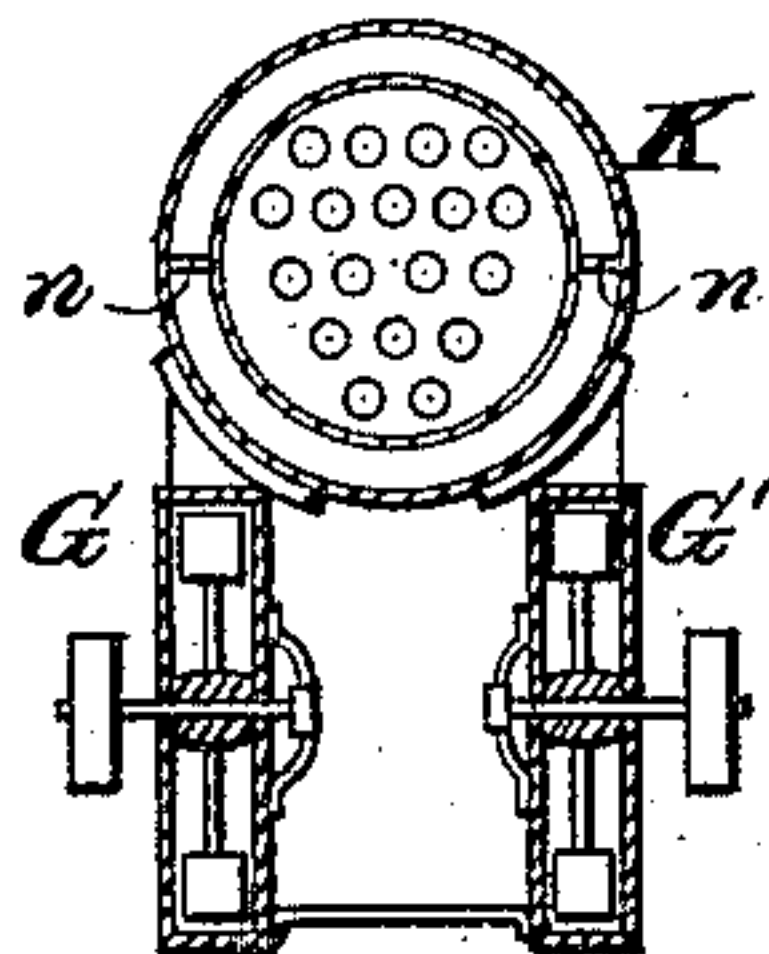


Fig. 5.



Witnesses.
Robert Elliott.
Geo. W. Rea

Inventor,
William Stephenson.
By W Bruce
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM STEPHENSON, OF JORDAN, ONTARIO, CANADA.

BOILER AND STRAW-BURNING FURNACE.

SPECIFICATION forming part of Letters Patent No. 310,740, dated January 13, 1885.

Application filed January 6, 1883. (No model.) Patented in Canada May 3, 1881, No. 12,729.

To all whom it may concern:

Be it known that I, WILLIAM STEPHENSON, of Jordan, in the county of Lincoln, in the Province of Ontario, Dominion of Canada, have invented a new and useful Combined Boiler and Straw-Burning Furnace; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same.

10 The first part of my invention relates to the improved construction of a boiler and its furnace in such a manner that straw, grass, or kindred substances can be utilized and used as fuel in place of wood and coal when the
15 latter cannot be had conveniently and cheaply.

The second part of my invention relates to the construction of a jacket surrounding the boiler in such a manner that there will be a space of about three-quarters of an inch between them, and the exhaust-steam be enabled
20 to be extended around the outer surface of the boiler for keeping up the heat with less fuel than can be accomplished with ordinary steam-boilers.

25 The third part of my invention relates to the construction of a boiler in such a manner that sparks, &c., from the fire under the boiler will be arrested and extinguished before reaching the smoke-stack.

30 The fourth part of my invention relates to the construction of a boiler with two or a double fan employed, one of which is to create a blast to cause the fire to burn more intensely than ordinary, and the other draws
35 and forces the smoke through water to extinguish sparks arising from the combustion of the fuel. The fans are also so constructed as to be noiseless, as will be more fully shown hereinafter.

40 By reference to the drawings it will be seen that Figure 1 is a side elevation of an apparatus embodying my invention. Fig. 2 is a vertical section of the same; Fig. 3, a plan view of the same; Fig. 4, a cross-section of the
45 horizontal part of the boiler, showing the division on each side between the boiler and jacket; Fig. 5, a top view of the sharp-pointed tongue in the fans. Fig. 6 is a vertical transverse section through center of fans
50 G and G' on line *xx*.

I construct the boiler and straw-burning apparatus somewhat similar to the portable farm-

engine now in use in thrashing, &c., but with the following improvements: I make the bottom of the vertical portion of the boiler funnel-shaped or tapering, with the grate-bars at the bottom, by which means the burning straw keeps falling to the center, immediately over where the blast enters, and is thoroughly consumed. The air from one of the fans passes
55 up through every alternate space between the grate-bars, and thus enables the ashes to fall down the remaining spaces where the air-blast does not come up, and drop into a pan of water, under the bottom of the fire-box, where the
60 sparks are extinguished.

A is the boiler; B, the fire-box; C, the steam-space; D, the hot-water space outside of fire-box. I construct a jacket, K, to surround the boiler, except the front portion of it where the
65 return-pipe is located, made of sheet-iron or kindred substance, and there will be a space, M, between the jacket and boiler, of about three-quarters of an inch. This space, when the machine is in operation, will be filled with
70 exhaust-steam, except the lower part of boiler, which forms the ash-pan, and is filled with water before escaping at the pipe J with the smoke. By this means the boiler will not cool
75 so rapidly, and steam will be kept up with much less fuel than would otherwise be required.

O is a pan of water under the grate-bars, having its inlet at O', and is for extinguishing the sparks from the fuel.

E E are openings for smoke at the end of the horizontal part of the boiler leading into the
80 flue F under said portion of the boiler, and connecting with the fan G. Said fan is for the purpose of drawing the smoke to itself and forcing it through the water in O to the exit-flue J, where the exhaust unites with the
85 smoke and passes off together.

H is a flue or pipe leading from the return flue F to the fan G.

H' is a tube leading from the fan G to the annular space I, communicating from the exit-flue J.
90

G' is a second fan, placed alongside of the other one, G, and is for the purpose of supplying fresh air to the fire through the tube
95 I', which is bent at right angles under the grate-bars N, and provided with a number of holes, *a*, to admit a blast of air between every other grate-bar. By this means the ashes and em-
100

bers drop through the spaces between the bars where there is no blast, and fall into the water O underneath.

N is the grate, with about six or eight bars, and which may be cast in one piece.

g and *h* are slanting partitions, placed in the exhaust-steam space between jacket and boiler, to divide the steam-space from smoke-space; and *m*, a horizontal partition connecting the two said partitions *g* and *h*, to divide the flues H and H' at that point. *n n* are partitions on each side of the horizontal part of the boiler, respectively, between the jacket and the outer surface of the boiler, to divide the smoke-space from the exhaust-steam space.

G'', Fig. 5, is a sharp-pointed tongue, secured at the lower part of the fans for the purpose of causing said fans to work without noise.

e'' are strips for the purpose of affixing a seed-drill, D'', to the front of the apparatus.

My apparatus is also adapted to be connected to other agricultural implements—such as land-rollers, plows, and harrows—by suitable connections, so that the seed-drilling, land-rolling, plowing, and harrowing can all be done at the same time.

The expense of running my machine is very small, on account of the trifling cost of fuel, and the construction of boiler and jacket, which economize the fuel without waste.

The peculiar make of the boiler, with the fan-blast, enables fuel of an inferior quality to

be used with success and economy in running the machine, as well as the ability to raise steam quickly, and giving the operator power to control the fire fast or slow, as he may require it.

The construction of the jacket outside of the boiler and steam-space, between the jacket and boiler, for exhaust-steam prevent cold air from coming in direct contact with the boiler; consequently less fuel is required to keep up steam.

What I claim as my invention is—

1. The combination of the fire-box, hot-water and steam chamber surrounding the same, a water-tank below said fire-box and chamber, and the fans G and G', all substantially as and for the purposes set forth.

2. The combination of the fire-box, a hot-water and steam chamber surrounding the same, an exhaust-steam space surrounding said chamber and inclosed by a steam-tight jacket, and the partitions *g h m n n*, all substantially as and for the purposes set forth.

3. The combination of the fire-box having horizontal smoke-passages connected with the same, the return-flue F, smoke-fan G, steam-chambers D and M, water-tank O, and exit-pipe J, all substantially as and for the purposes set forth.

WM. STEPHENSON.

In presence of—

GEO. B. ELLIOTT,
PETER BEGG.