

J. J. Dutcher,
Steam-Boiler Furnace.
Nº 12,673. Patented Apr. 10, 1855.

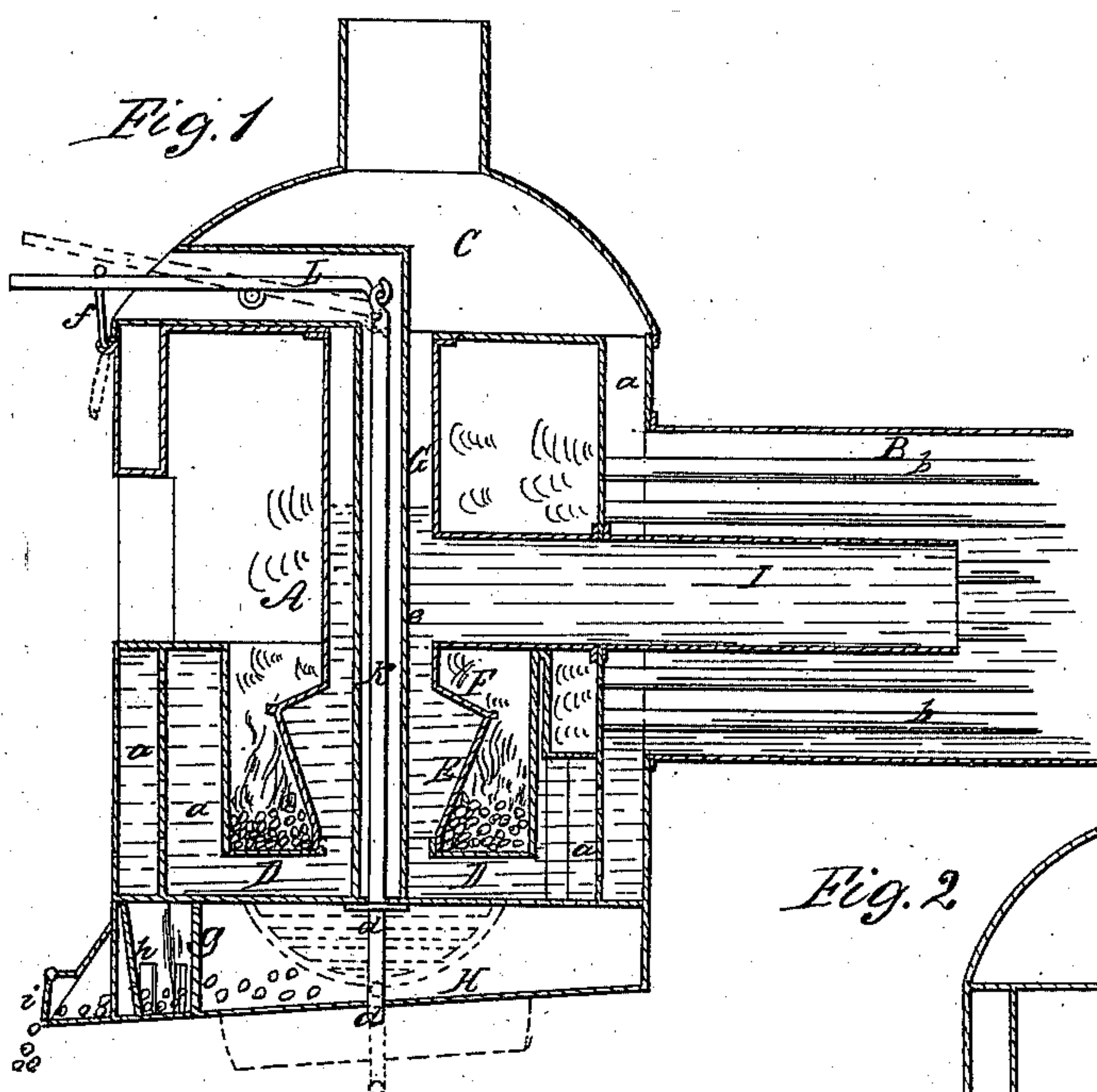


Fig. 2

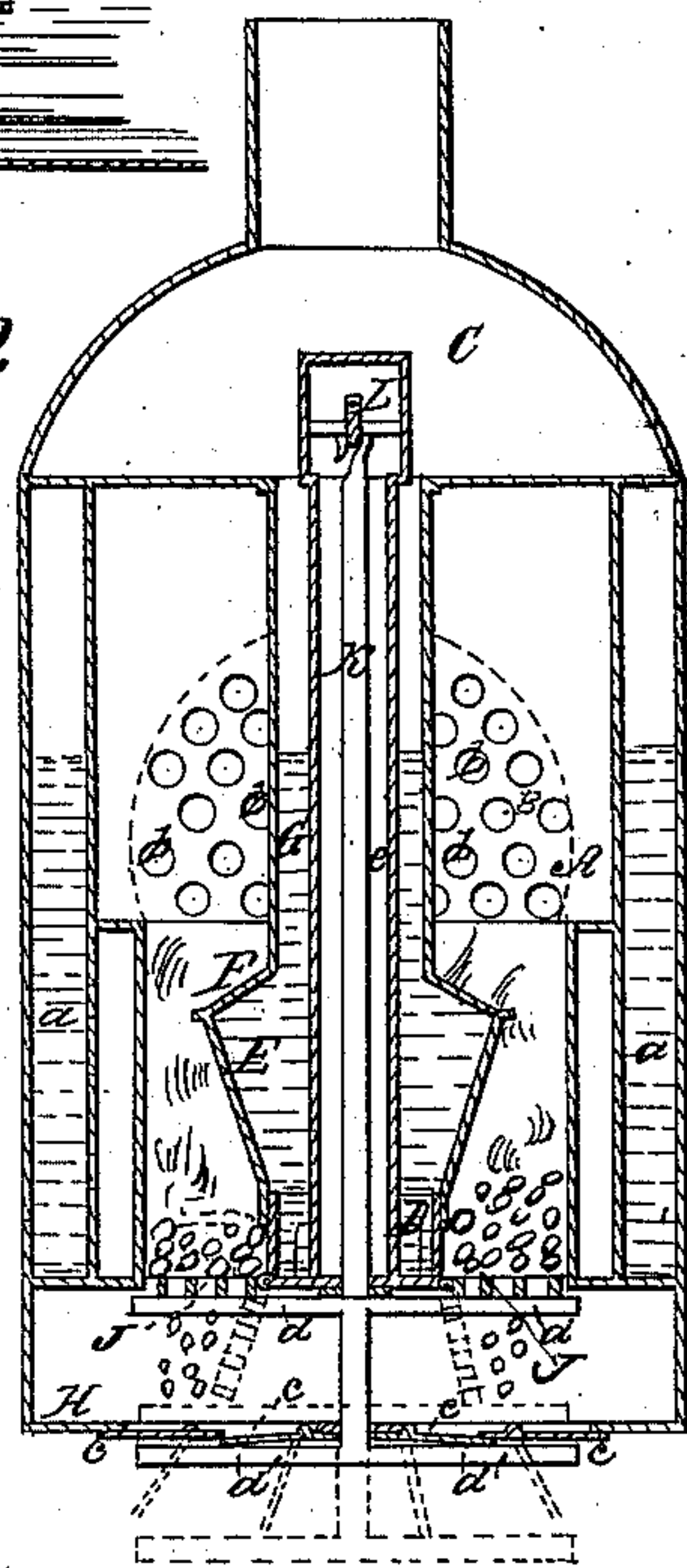
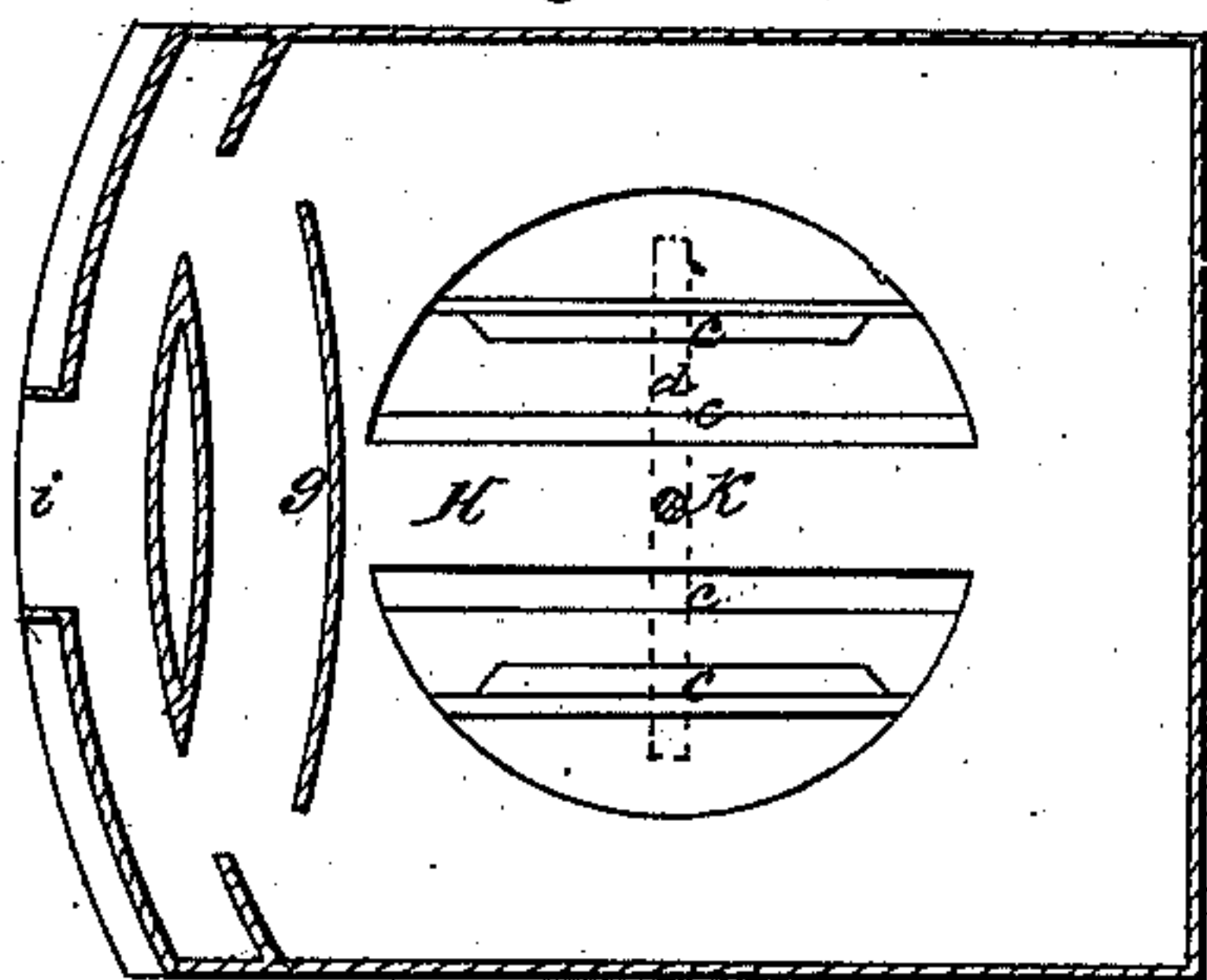


Fig. 3



UNITED STATES PATENT OFFICE.

JOSIAH J. DUTCHER, OF NEW HAVEN, CONNECTICUT.

LOCOMOTIVE-BOILER.

Specification of Letters Patent No. 12,673, dated April 10, 1855.

To all whom it may concern:

Be it known that I, JOSIAH J. DUTCHER, of the city and county of New Haven and State of Connecticut, have invented certain
5 new and useful Improvements in Coal-Burning-Locomotive Boilers and their Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accom-
10 panying drawings, forming part of this specification, in which—

Figure 1, is a central vertical section taken in a longitudinal direction, of the furnace and part of a boiler constructed according
15 to my invention. Fig. 2, is a central vertical section of the furnace taken in a transverse direction. Fig. 3, is a horizontal section of the ash pan.

Similar letters of reference indicate cor-
20 responding parts in the several figures.

This invention consists in the peculiar arrangement of water spaces within and contiguous to the furnace, and leading there-
from to the body of the boiler.

25 It also consists in a certain arrangement of the fire grate combined with the provision of traps in the ash pan, and with certain appliances in connection with the grate and the said traps, whereby the grate and
30 the said traps may be opened to let out the fire and closed again immediately by the engineer or fireman while at his usual post on the locomotive.

It further consists in providing the ash
35 pan with a suitable arrangement of curls to check the discharge of its contents during the running of the engine in order without preventing a free discharge of ashes coals &c. falling from the fire to cause them to
40 be discharged by a circuitous course thereby allowing time for the partial cooling of live coal that may fall through the grate, and preventing injury that might result from the discharge of live coal upon the
45 track.

To enable those skilled in the art to make and use my invention I will proceed to describe its construction and operation.

50 A, is the furnace surrounded with the usual water space *a, a*, which communicates with the cylindrical body B, of the boiler and with the steam chamber C, in the usual manner.

55 *b, b*, are fire tubes leading in the usual way from the furnace through the body of the boiler to the smoke box and chimney.

D, is a horizontal pipe leading from the front to the back part of the water space *a, a*, just above the fire grate, the bottom part of the side pipe being about level with the
60 grate. This pipe I prefer to make of flat form at the bottom and sides but to make its upper side rounded or of inverted V, form to prevent the settlement thereon of the dust from the fire. From this pipe D, into the
65 center of the fire box which I prefer to make of upright cylindrical form, there rises a hollow inverted frustum of a cone E, which rises about as high as the fire box is intended to be filled with fuel, and the upper
70 part of this cone E, is connected by a slightly conical plate F, with an upright cylinder or tube G, which rises through the center of the furnace and connects with the crown plate thereof.

75 A communication is by the above means established between the pipe D, and the steam chamber C. From the cylinder or tube G, a horizontal tube I, runs some distance along the body of the boiler and opens
80 thereinto. The cone E, being surrounded by the fire, has the water within it exposed to an intense heat, and steam is rapidly generated, and the steam in rising produces a rapid upward circulation of water from the
85 bottom of the space *a, a*, through the tube D, the inverted cone E, and cylinder G. This water is partly discharged by the pipe I into the body of the boiler at a distance from the fire box. The inverted cone not
90 only has the advantage of presenting a large heating surface in an effective manner to the fire but it prevents the fire packing, by making the fire box larger at the bottom than at the top where it receives the fuel,
95 and it allows the free escape of ashes.

The fire grate is formed in two parts J, J, see Fig. 2, which are hinged to opposite sides of the pipe D, and are capable of opening downward. The ash pan H, has
100 under the grate a number of openings each provided with a hinged trap *c*, by which it may be closed, the said traps being capable of opening downward by their own weight. The grates and the traps *c, c*, are supported
105 by arms *d, d*, and *d', d'*, on an upright rod K, which is suspended from a lever L, which is within the control of the engineer or fireman while at his usual post. The rod K, has to be incased within a small water
110 tight tube *e*, which runs from the bottom of the tube D, clear up through the cone E,

and the cylinder G. A catch *f*, see Fig. 1, or some other means of security must be employed to hold down the outer end of the lever L, and thereby hold up the rod K high enough for its arms *d*, *d*, *d'*, *d'*, to keep the grates and the ash traps *c*, *c*, closed as shown in black outline in Figs. 1, and 2.

When it is desired to let out the fire the catch *f*, is released and the weight of the rod K, would of itself be sufficient to cause it to fall and set free the grates and ash pan, but the weight of the grates and the fire will surely be sufficient to pull it down. The fire will fall through the traps in the ash pan. The grates and the ash traps may be quickly replaced by pulling down and securing the outer end of the lever. This will enable the fire when clinkered to be quickly let out and rebuilt by the fireman without leaving his post on the locomotive. In all the railroad stations, pits may be provided in the middle of the track to drop the fire into, but in case of great necessity the fire might be let out and rebuilt while the engine is running.

The ash pan H, inclines downward toward the rear end, so that the ashes, &c., falling on it from the fire, when the engine is in motion will gradually descend. Almost immediately in rear of the fire grate, an upright curb plate *g*, stands up from the bottom of the ash pan. This curb plate has a rounded front so that as the ashes &c strike it, they are thrown off toward the sides, where there is space enough left for them to escape. Behind the curb *g*, is a second curb plate *h*, which is so formed as to throw the ashes &c a little toward the center before letting them escape to the opening *i*, at the back of the ash pan where

they drop out. By using curbs as above described to retard the escape of the ashes &c time is allowed for them to cool before leaving the ash pan, as there will always be a thin bed of ashes on the bottom of the ash pan any live coals falling through the grate, upon it, will be prevented quickly running out.

What I claim as my invention and desire to secure by Letters Patent, is—

1. The within described arrangement of water spaces within and contiguous to the furnace and leading therefrom to the body of the boiler consisting of the horizontal pipe D, inverted cone E, upright tube G, and horizontal tube I, all connected substantially as herein described.

2. In combination with a hinged fire grate or grates to the boiler furnace I claim providing hinged traps in the ash pan to be lowered and raised or opened and closed simultaneously with the fire grate or grates, by means of an upright rod K, passing through the boiler and suspended from a lever L, within the control of the engineer or fireman, while at his usual post, the said rod K, operating upon the said grates and traps by means of arms *d*, *d*, *d'*, *d'*, or their equivalents, all substantially as herein described.

3. Retarding the escape down the inclined ash pan of the ashes coal &c falling thereon through the grate, by means of curb plates *g*, *h*, arranged as described or in any equivalent manner to make the said ashes, coal &c take a circuitous direction.

JOSIAH J. DUTCHER.

Witnesses:

JOHN C. HOLLISTER,
C. WINSHIP.