

A. M. SEARLES.

Grate.

No. 15,825.

Patented Sept. 30, 1856.

Fig. 1.

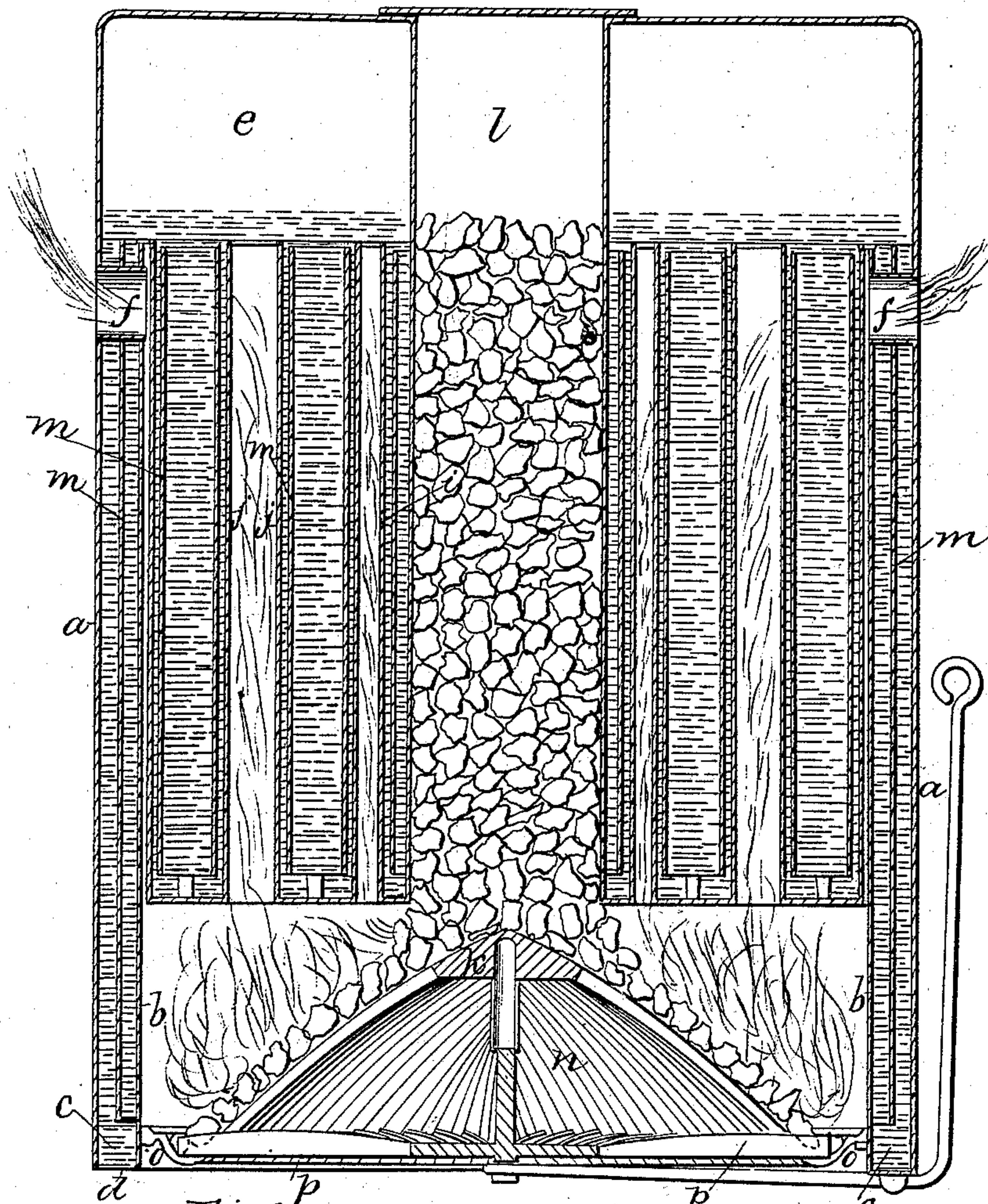


Fig. 2.

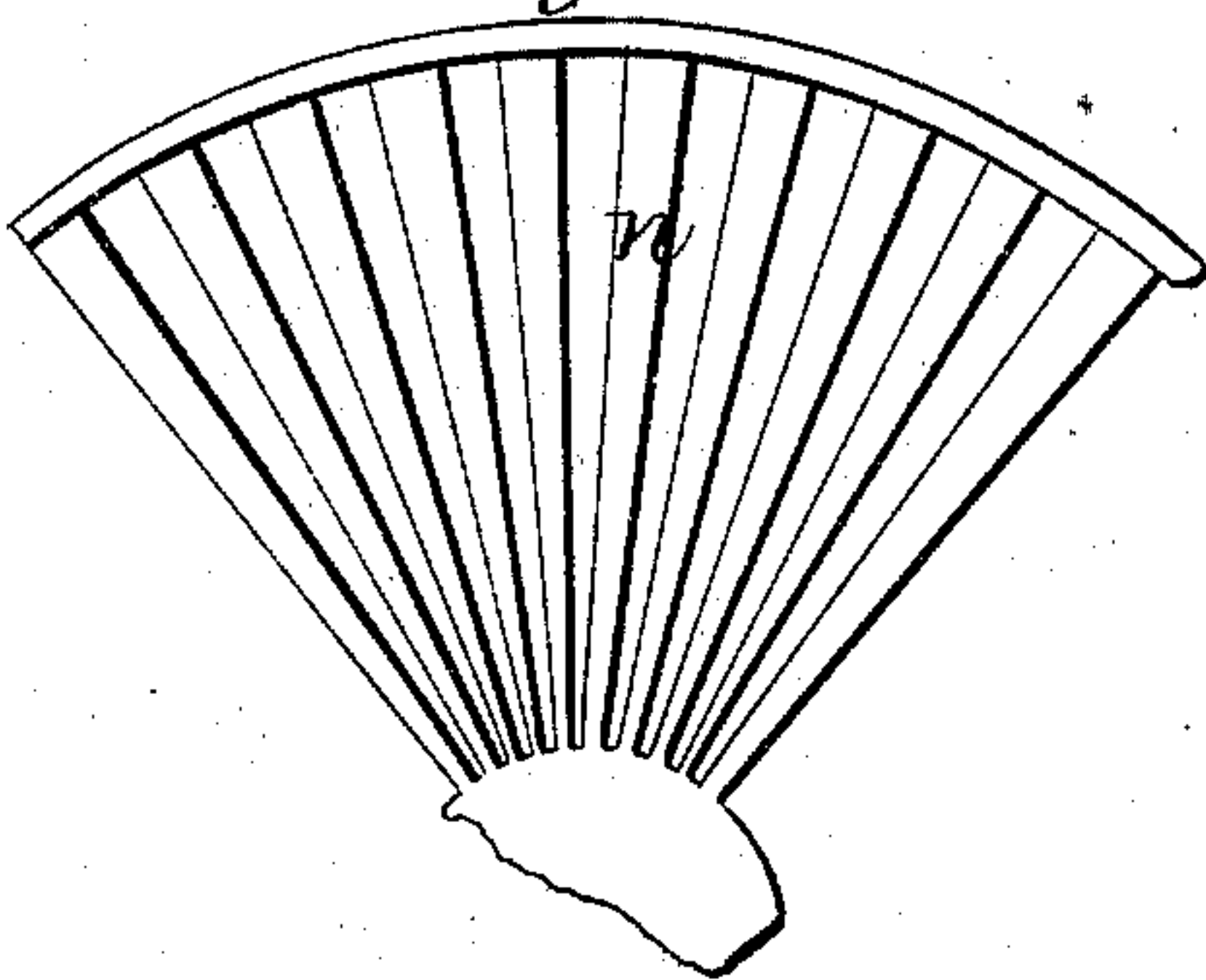
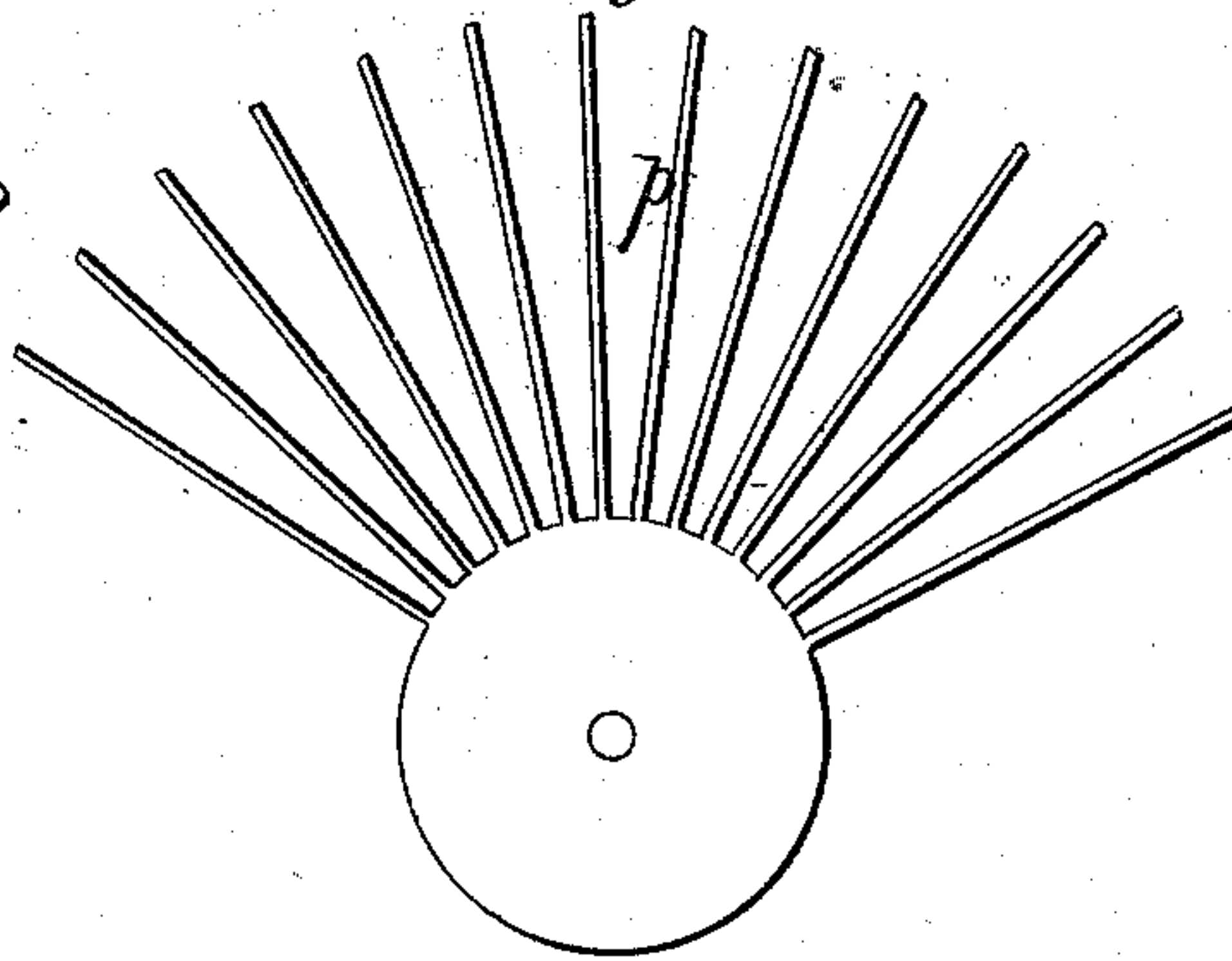


Fig. 3.





# UNITED STATES PATENT OFFICE.

A. M. SEARLES, OF CINCINNATI, OHIO.

## STEAM-BOILER GRATE.

Specification of Letters Patent No. 15,825, dated September 30, 1856.

*To all whom it may concern:*

Be it known that I, ASBURY M. SEARLES, of Cincinnati, Hamilton county, Ohio, have invented a new and useful Improvement in  
5 Grates for Steam-Boilers; and I hereby declare the following to be a full and exact description thereof, reference being had to the annexed drawing as making part of this specification.

10 In the accompanying drawings Figure 1 is an axial section. Fig. 2 is a top view of a portion of the grate. Fig. 3 is a top view of a portion of the poker.

(a) is the outer shell of a cylindrical  
15 boiler, placed in a vertical position.

(b) is a somewhat smaller cylinder so supported concentrically within the other as to leave a narrow space (c) between the sides of the inner and outer cylinders. This  
20 space is closed at bottom by an annular plate (d) but opens above into a space (e) between the tops of the two shells intended to contain steam. This annular space contains also a cylindrical shell (m) intermediate  
25 between the other two and extending from the top of the annular space to within a short distance of the bottom of it.

The interior of the innermost shell forms a hot air chamber or dome having commu-  
30 nication outward through flues (f) which cross the annular space at or near its upper portion.

From the upper head of the inner cylinder there depend a number of tubes (i, j,) of which the central one (i) is much larger  
35 than the others. These tubes pass down into the fire space to within a short distance of the grate (hereafter described.) They are closed at bottom and open at top, so as  
40 at their upper ends to communicate freely with the space between the cylinders. The upper portion of the flue space around the tubes has free vent for the smoke by the flues (f,) before spoken of.

45 Within the central tube (i) there is fixed concentrically another one (l) which, extending from the bottom of the tube (i) to the top of the outer shell, is open at both ends so as to afford a free passage to the

fire place, from its entrance at top to its  
50 delivery at bottom. This tube may be made of uniform caliber throughout its length as shown or may flare somewhat downward to facilitate the descent of the coal. This tube  
(l) being filled with coal (broken to the  
55 proper size) gradually discharges its contents into the grate as the latter by combustion and discharge of the consumed portions becomes clear of obstruction. The film of  
60 water surrounding the tube (l) both guards the coal from such a heat as would volatilize or ignite any of it, and at same time gradually warms and completely dries the coal as it descends so as to present it to the  
65 fire space in the state most favorable for ignition.

Another great advantage consists in the regularity and freedom from sudden chills and changeable drafts with which the supply of fuel is effected.  
70

(m) are tubes placed concentrically a little within the others and serve the useful purpose of preventing priming even with a rapid evolution of steam because the steam naturally forming and seeking vent between  
75 the walls of the annular passage thus formed the foot of the tube is constantly replenished by a stream of water down the central portion.

The grate consists of a conical hub (k) 80 from which emanates a conical arrangement of bars (n) which being recurved somewhat upward toward the skirt, form what I call the "curb" (o). The conical hub is placed a little below the vent of the coaling tube.  
85 The radial position of the bars and the enlarged opening of the interstices at their lower part facilitate the discharge of ashes as the coal descends along the grate.

(p) are a number of pokers projecting 90 radially from a common center. These pokers when not in use rest a little below the grate, but are capable by means of suitable levers as represented of being driven up through the interstices so as to open the  
95 fire, remove clinkers, &c.

The relative obliquity of the pokers and bars is such as to give a shearing or sliding

action to the former against the latter most favorable to their effective action.

I claim as new and as my invention herein:—

- 5 1. The described conical grate ( $h, n, o$ ) formed by diverging radial bars, and having the described recurved margin or otherwise, or equivalent devices for the purposes explained.
- 10 2. I claim in the described connection

with a conical grate, the radial series of pokers ( $h$ ) (or its equivalent) having the explained shearing action between the grate bars.

In testimony whereof, I hereunto set my hand before two subscribing witnesses.

A. M. SEARLES.

Witnesses:

GEO. H. KNIGHT,

JAS. H. GRIDLY.