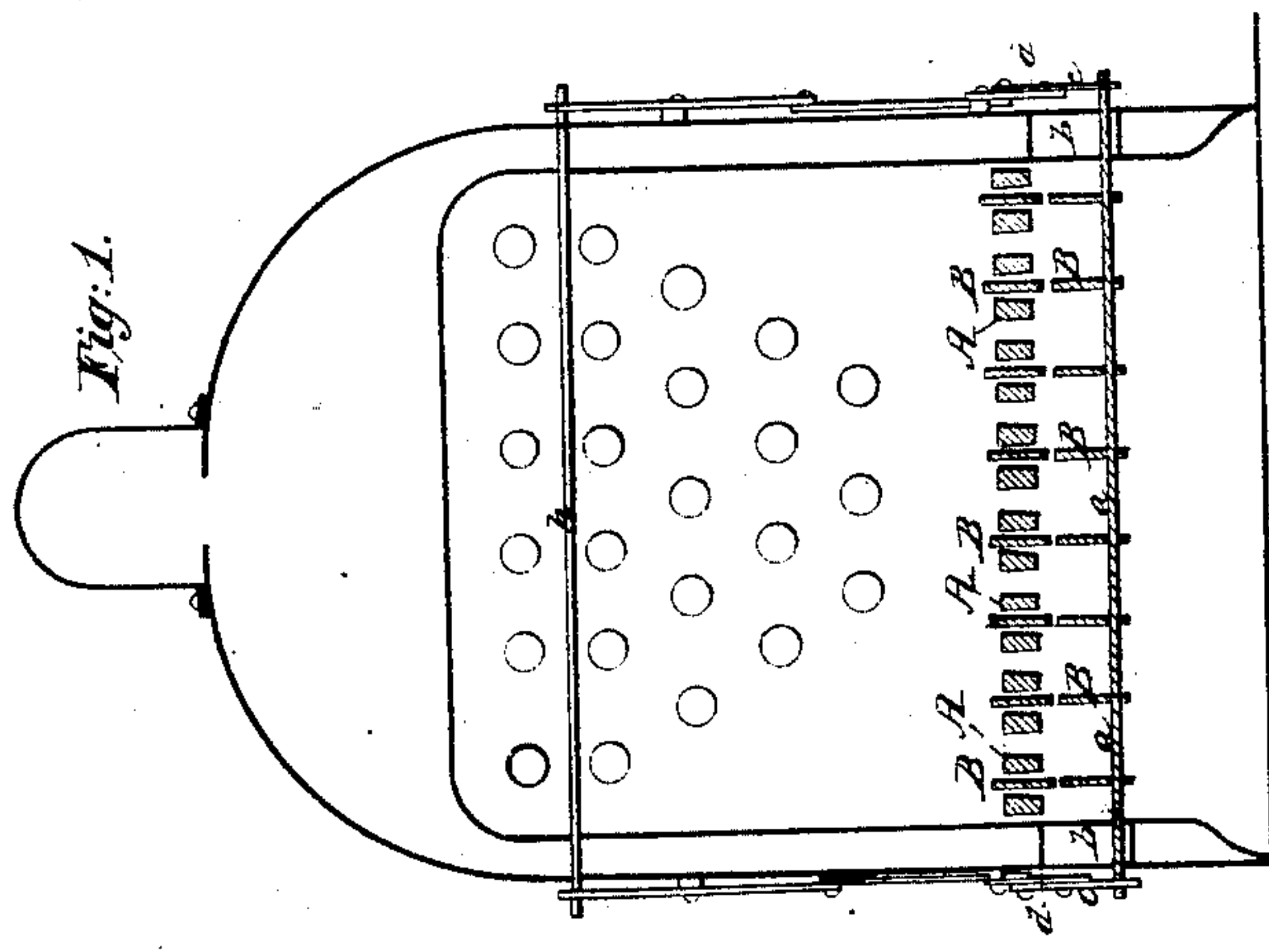
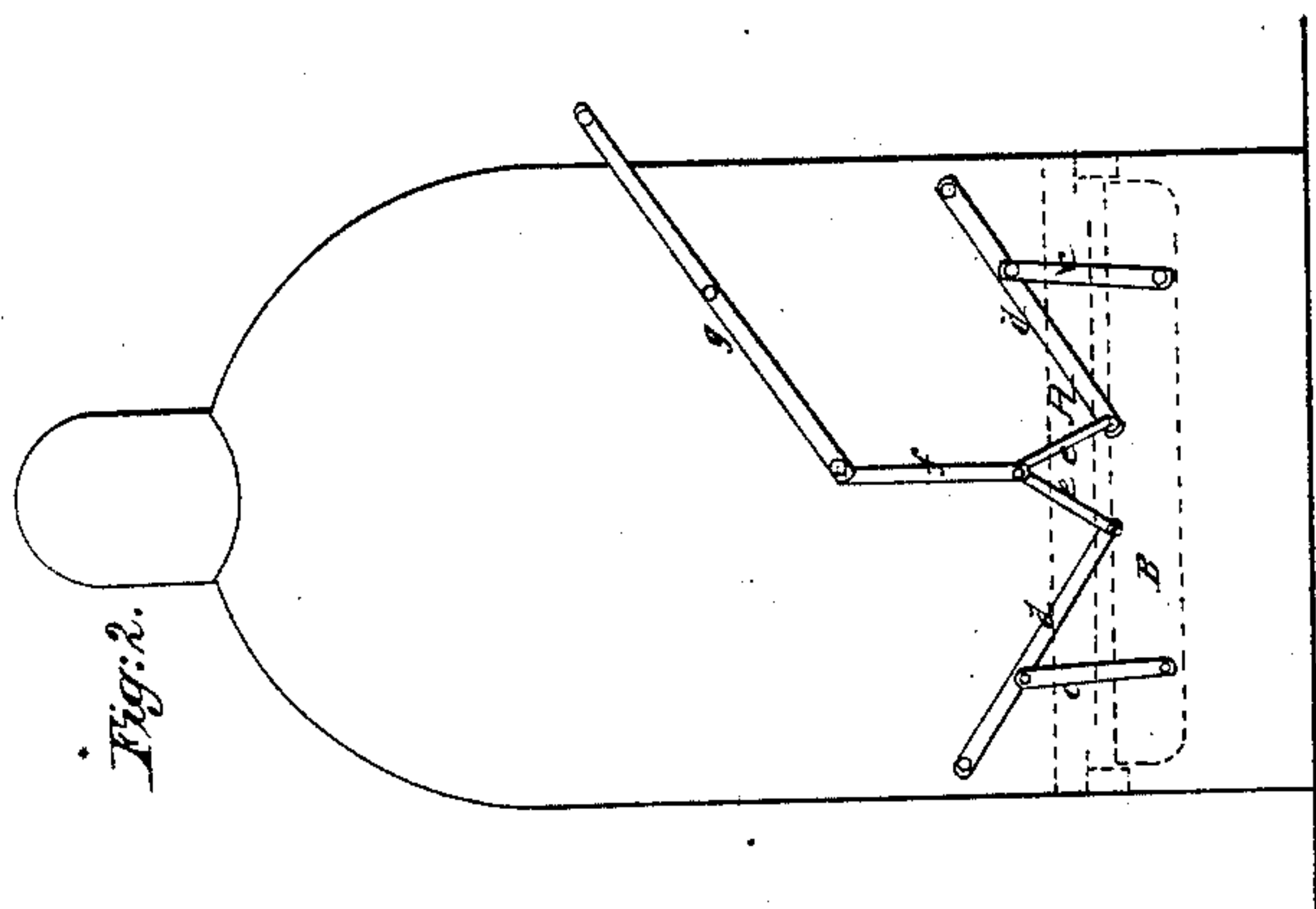


E. J. McCarthy,

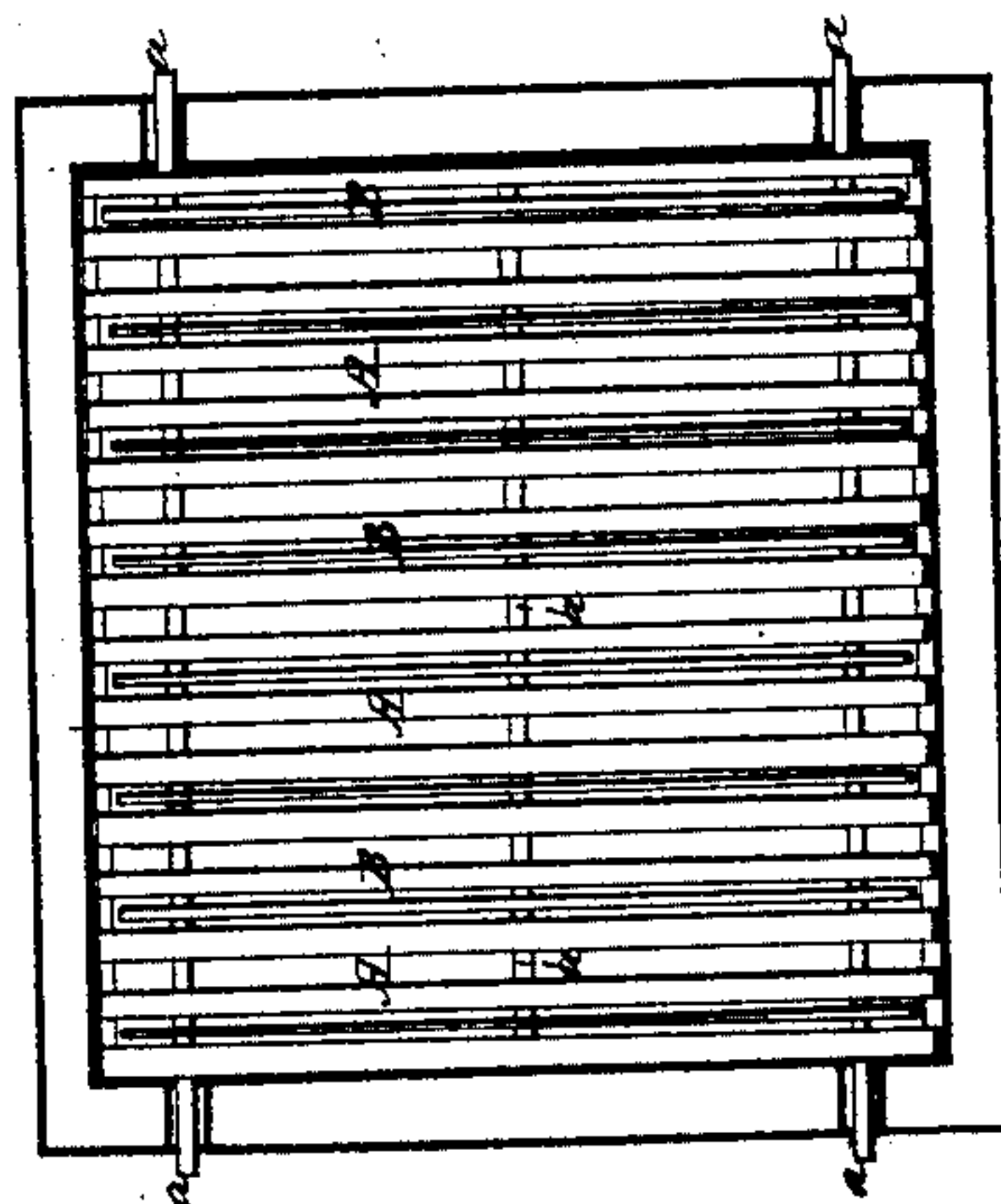
Furnace-Grate Bar.

N^o 24,815.

Patented July 19, 1859.



Witnesses:
A. E. Greer
E. J. McCarthy



Inventor
E. J. McCarthy

UNITED STATES PATENT OFFICE.

E. J. MCCARTHY, OF SAUGERTIES, NEW YORK.

FURNACE-GRATE.

Specification of Letters Patent No. 24,815, dated July 19, 1859.

To all whom it may concern:

Be it known that I, E. J. MCCARTHY, of Saugerties, Ulster county, State of New York, have invented certain new and useful

5 Improvements in Locomotive Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification, in which—

10 Figure 1, represents a vertical transverse section through the fire box of a locomotive engine, to which my improvement is applied. Fig. 2, represents a side view of the fire box, and Fig. 3, represents a horizontal

15 section through the fire box above the grate bars.

My improvement has reference to locomotive engines in which coal is used as the fuel for generating steam.

20 The difficulties attendant upon using coal as a fuel in locomotive engines arise chiefly from its slowness of combustion, from its being shaken into a compact mass by the motion of the engine, from the large amount

25 of earthy matter it contains, and from this earthy matter being melted by the intense heat of the fire, and forming what are termed clinkers which adhere to, and clog the grate bars. Thus the passage of air

30 through the fire, is obstructed and the coal prevented from burning unless lightened up, and the clinkers removed from the grate bars. The method heretofore most generally

35 adopted in locomotive engines, to open the fire and remove the clinkers has been by means of a poker operated through the open door of the furnace, or by giving the grate bars a vibratory or shaking motion. Neither

40 these, nor any other of the modes heretofore adopted effectually accomplish the object.

My invention for effecting this object consists in the application of a secondary movable grate consisting of a series of blades

45 connected with each other and arranged below and opposite the openings between the stationary grate bars, so that when raised up they will pass between and above the upper surface of these bars, and thus

50 raise up, and effectually open the fire, free it from ashes, and remove and break up the clinkers from the grate bars the entire width and length of the fire box; then drop the stationary grate when not in use, and beyond

55 the influence of the intense heat of the fire which otherwise would warp, burn them out,

and render them unfit for use in a short time.

My invention will be more fully comprehended by reference to the accompanying 60 drawing in which is represented my improvements applied to the fire box of an ordinary locomotive engine.

The grate bars (A) of the fire box are arranged and supported in the ordinary man- 65 ner, and below the grate is a set of movable bars or blades (B) connected together, arranged parallel with, and directly beneath the openings between the grate bars and extend the entire length of the grate bars be- 70 tween the bearings. These blades are connected with each other by transverse bars (a) near the end and at the center. The end bars extend through openings (b) in the water legs on either side of the furnace, 75 which serve as guides to retain the blades in place and parallel with the grate bars. The outer ends of the transverse bars are connected by links (c) with levers (d) piv- 80 oted to the water legs at one end and connected by links (e f) with a lever (g) which extends beyond the face of the fire box.

For convenience of the fireman in operating the side levers they are connected together by a bar (h) extending across in 85 front of the firebox. In depressing the bar (h) the blades are raised by the side levers, passed between the grate bars and above their upper surface, for the entire width and length of the grate, effectually remove the 90 clinkers adhering to the grate bars, raise up and open the fire, so that the cinders and ashes sift through the coals and fall between the blades and grate bars and are received in the ash pan. Thus a free passage for 95 the air through the fire is opened—the draft increased whenever the grate bars become clogged and the fire deadened. On releasing the handle (g) the blades fall pass between the grate bars and remove any ashes 100 or clinker adhering to their sides, and descend so far below as not to obstruct the free passage of the air between the bars, and also, so as not to be beyond the influence of the intense heat of the furnace. I do not 105 confine myself to precise number, form or arrangement of these movable blades, provided they pass, when raised to their full height, between and above the grate bars, and when dropped, fall below and beyond 110 the influence of the intense heat of the fire. Any form or arrangement of mechanism

thought proper, may be used to raise these bars, and instead of that I have proposed as this constitutes no part of my invention.

Having thus described my improvement
5 in locomotive engines, what I claim therein as new, and desire to secure by Letters Patent, is—

A furnace with a series of stationary grate bars in combination with a series of
0 movable blades, so arranged as to pass between and above the bars, and descend be-

low so far as not to obstruct the draft, and be beyond the influence of the intense heat of the furnace, as described for the purpose set forth.

In testimony whereof I have subscribed
my name.

15

E. J. McCARTHY.

Witnesses:

A. E. GREEN,
GEO. T. HAWS.