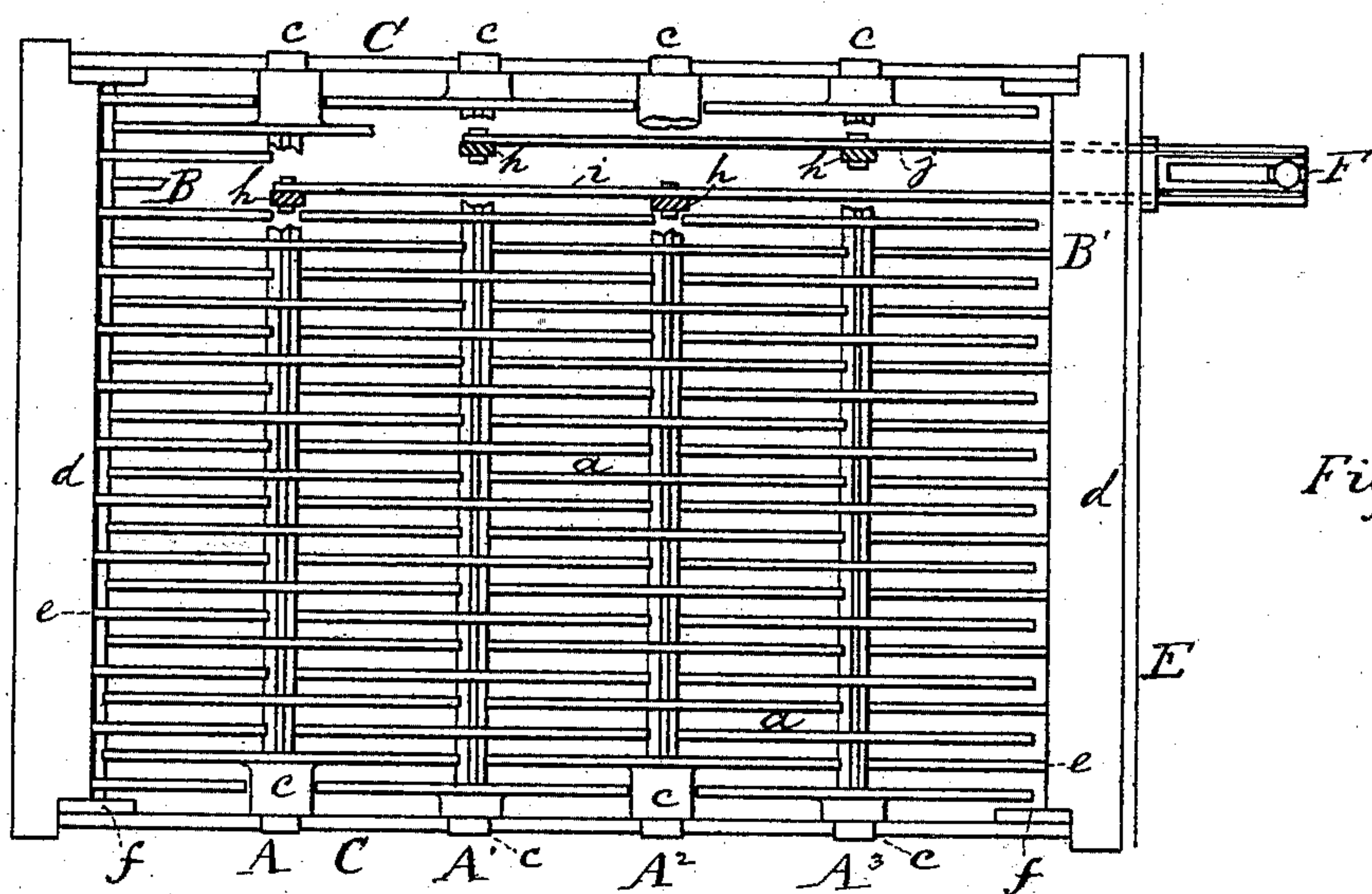
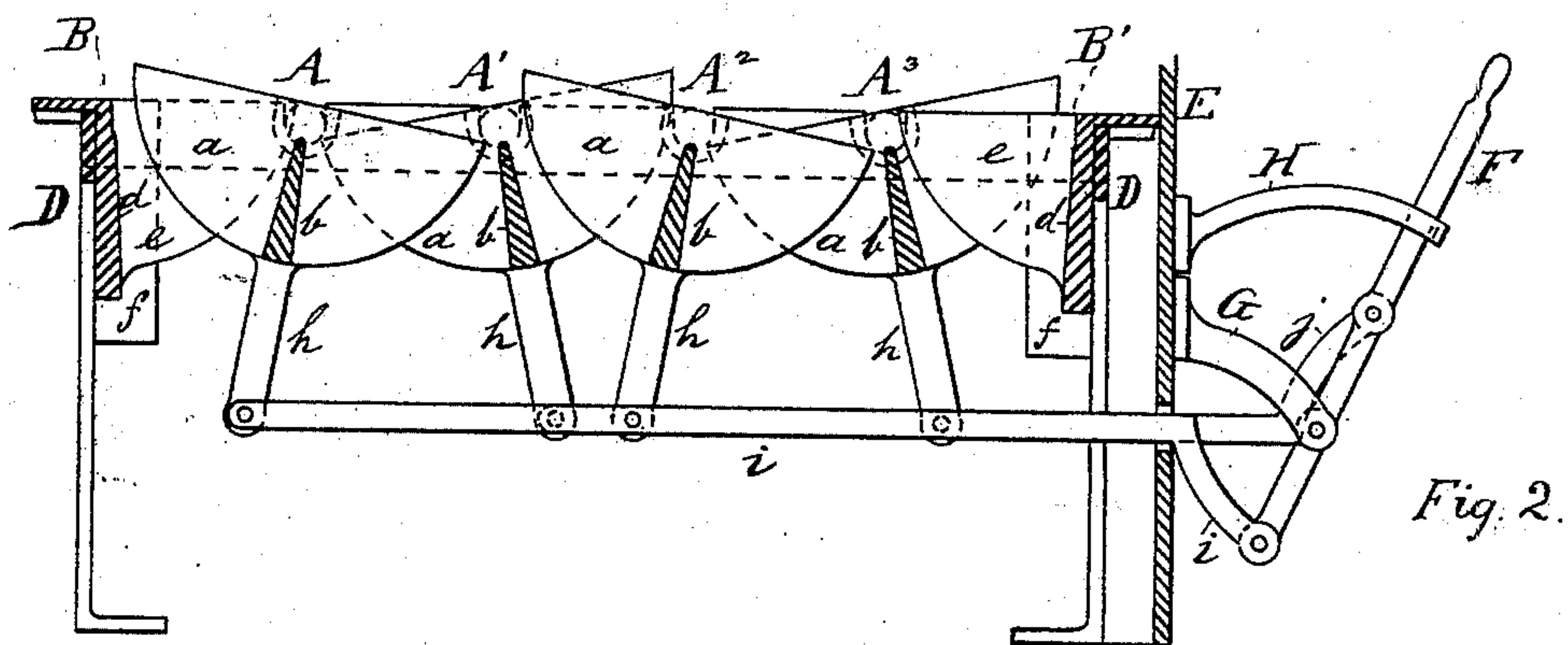
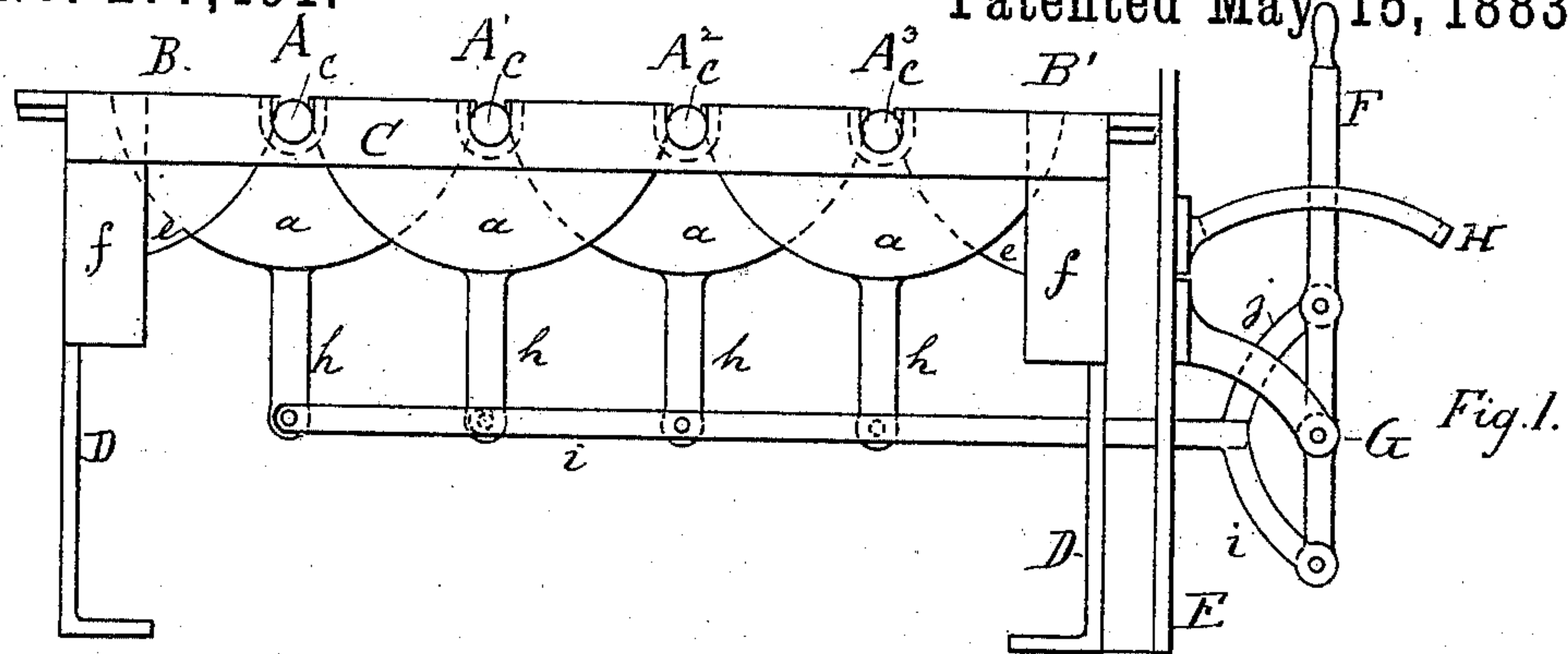


(No Model.)

T. KIRKWOOD.
GRATE FOR FURNACES.

No. 277,491.

Patented May 15, 1883.



WITNESSES:

Adam J. White
Louis Volting.

INVENTOR

Thomas Kirkwood

BY

Wm. B. Lotz

ATTORNEY

UNITED STATES PATENT OFFICE.

THOMAS KIRKWOOD, OF CHICAGO, ILLINOIS.

GRATE FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 277,491, dated May 15, 1883.

Application filed March 21, 1883. (No model.)

To all whom it may concern:

Be it known that I, THOMAS KIRKWOOD, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Grates for Furnaces; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in the class known as "shaking grates;" and it consists of the novel devices and combinations of devices hereinafter described and specifically claimed.

In the accompanying drawings, Figure 1 represents an end elevation of the grate while on its level position; Fig. 2, a longitudinal section of the same in one of its extreme positions during the shaking operation; and Fig. 3 is a plan view of the same.

Corresponding letters in the several figures of the drawings designate like parts.

This grate is composed of a series (two or more) of shaking sections, $A A' A^2 A^3$, and of two stationary end sections, B and B' . The shaking sections consist each of a series of semicircular plates, a , arranged parallel at equal distance apart, and cast rigid with a longitudinal bar, b . The plates a form the grate-bars proper, and are placed with their straight edges upward, in line with each other, while the connecting-bar b projects from the bottom periphery upward, between the sides of such plates a , to a line below the top edge of the plates. Each section $A A' A^2 A^3$ has a trunnion, c , formed centrally to the top, at each end, which trunnions are journaled in notches of side bars, C . The plates a of each section A are relatively spaced to alternate and interlap the plates of the next adjacent section, and that the plates a of one section will extend centrally into the interstices between the plates of such adjacent section, and will reach to near the axial line of the same in a manner that the ends of plates of alternate sections will nearly meet, and apparently will form continuous grate-bars. The

end sections, $B B'$, consist each of an L-plate, d , that has cast to one side a series of quarter-circular plates, e , which alternate and interlap the plates a of the next adjacent sections A or A^3 . The L-plates d of sections $B B'$ are secured upon standard-frames D , on which the entire grate is supported; such standard-frames D having end flanges, f , for securing by bolts the notched bars C , that form the longitudinal connection for such frame. Each section $A A' A^2 A^3$ has a pending arm, h , and these arms of alternate sections $A A^2$ are in line with each other, and are pivotally connected to a bar, i , and the arms h of sections $A' A^3$ are also in line with each other, and are pivotally connected to a bar, j . These bars i and j project through openings in boiler-front E , and their projecting ends are curved in opposite directions. A lever, F , is pivoted to a bracket, G , that is secured to the boiler-front E , and to this lever F , at opposite sides and equal distance from its fulcrum, are pivotally connected the ends of bars i and j , in a manner that with swinging such lever F to and fro the bars i and j will be reciprocated in opposite directions, and the sections $A A^2$ will be oscillated reversedly to sections $A' A^3$, as shown by Fig. 2, and that when lever F is on its vertical or central position the upper edges of the plates a and e of all the sections will form a flat grate-surface. The quadrant H is for indicating the position for lever F when the plates a of the several grate-sections are turned to be on a horizontal line with each other.

A grate thus constructed is very strong and durable, and has a proportionally large percentage of air-passages. With shaking this grate it will loosen up the fire, will prevent clogging of the fuel, and will discharge the ashes and clinkers readily. In case one of the sections should be broken or burned it can be easily replaced by another, and the fireman need not open the fuel or ash-pit door for cleaning and loosening up the burning fuel.

What I claim is—

A grate composed of two or more sections, $A A' A^2 A^3$, each consisting of a bar, b , that carries a series of transverse semicircular plates,

a, is pivotally supported on trunnions *c*, and has a pending arm, *h*, such arms of alternate sections being coupled to a bar, *i* or *j*, and such bars *i* and *j* being connected with a lever
5 diametrically at opposite sides of its fulcrum, all substantially as and for the purpose described and shown.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

THOMAS KIRKWOOD.

Witnesses:

LOUIS NOLTING,
ADAM GEO. WHITE.