3 Sheets—Sheet 1.

N. F. RICE.

Bake Oven.

No. 26,126.

Patented Nov. 15, 1859.

Fig. 1

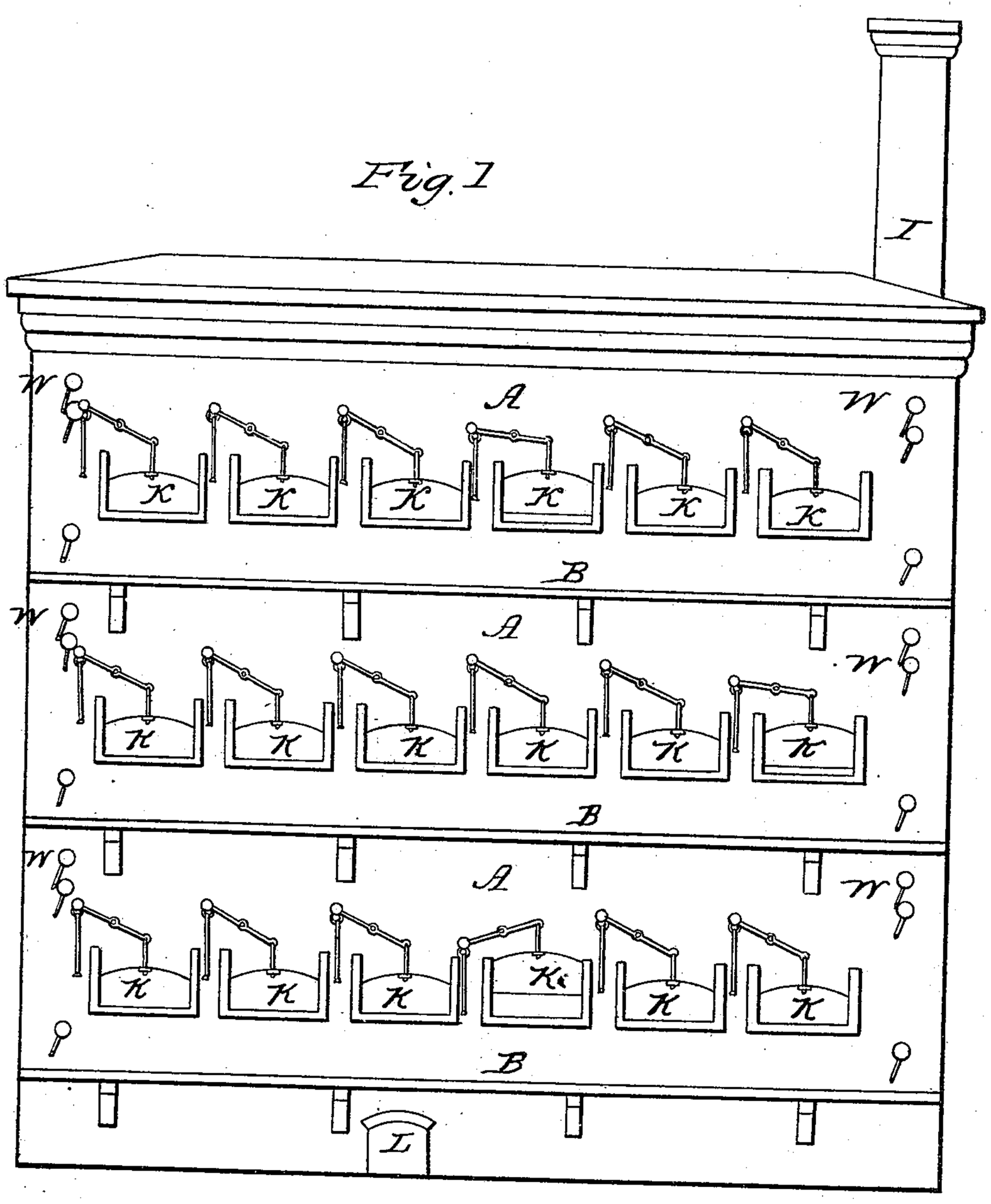
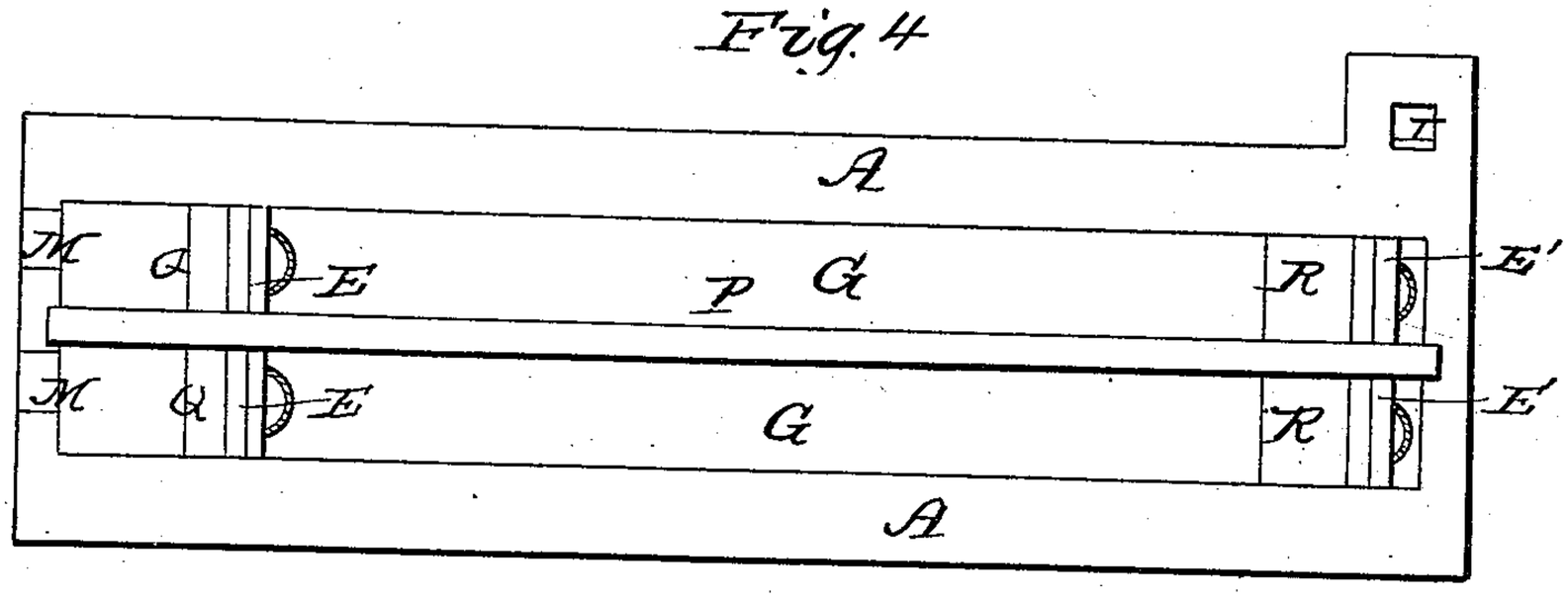


Fig. 4



3 Sheets—Sheet 2.

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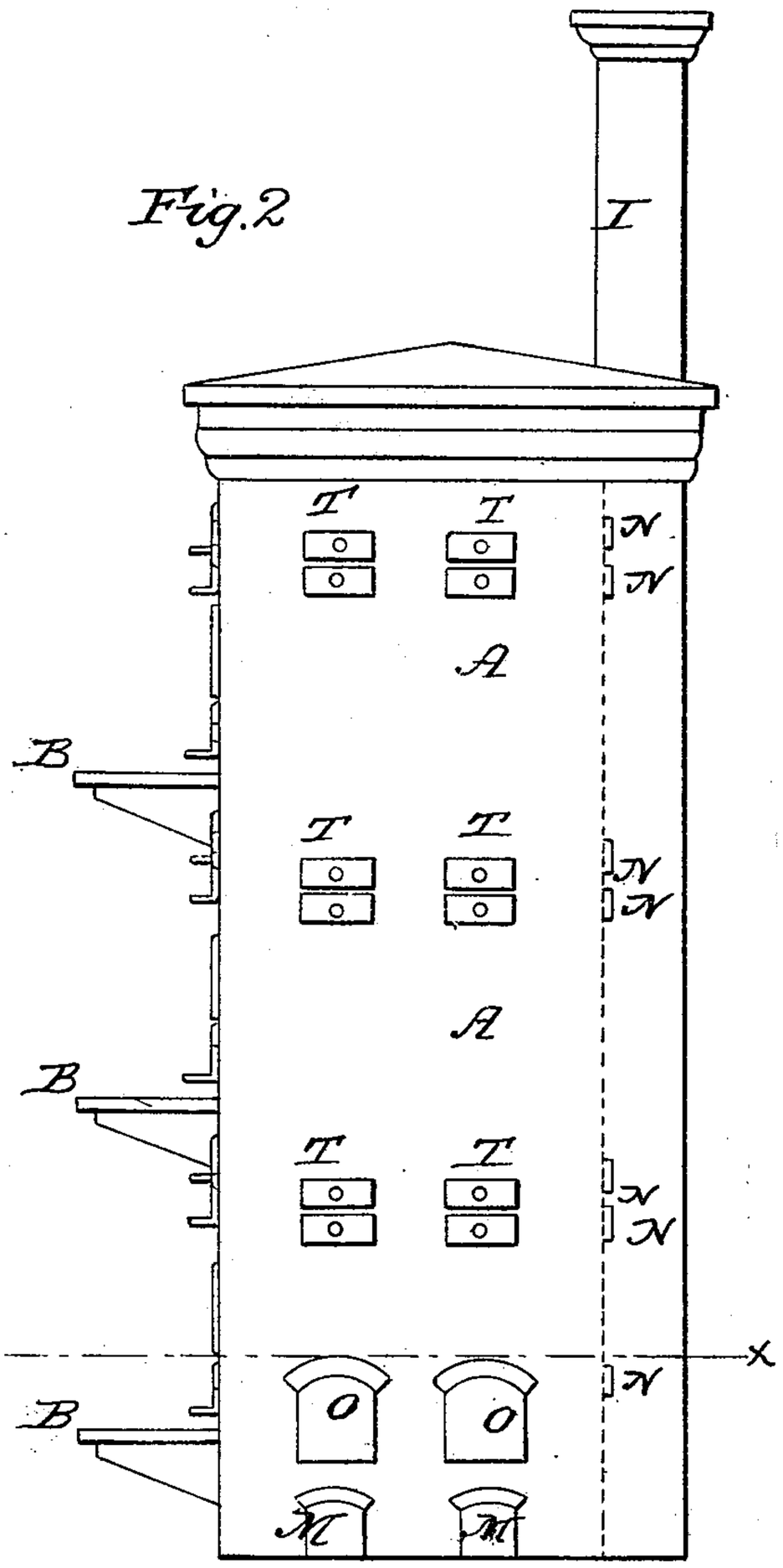
Fig. 2



3 Sheets—Sheet 3.

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Fig. 3

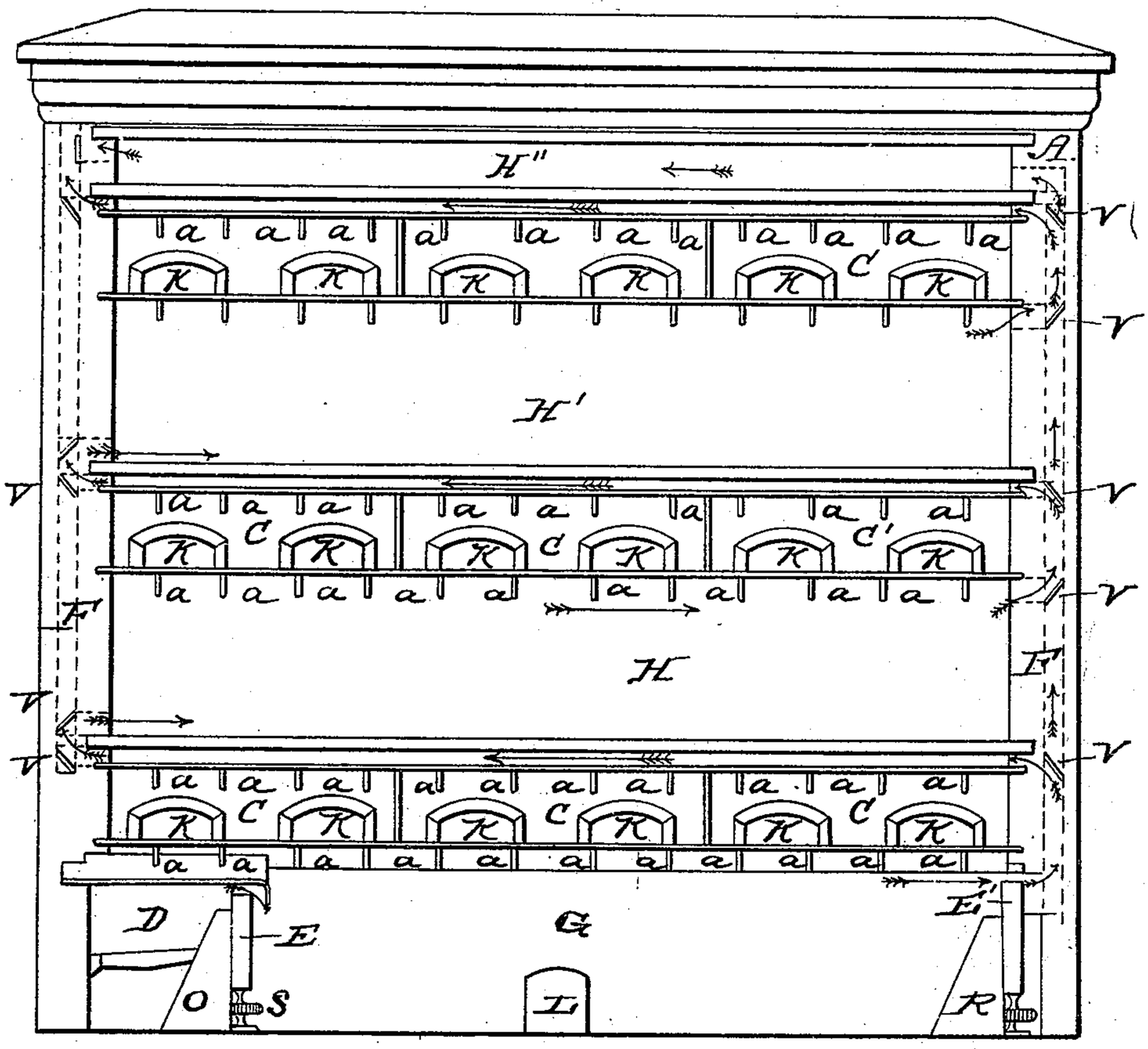
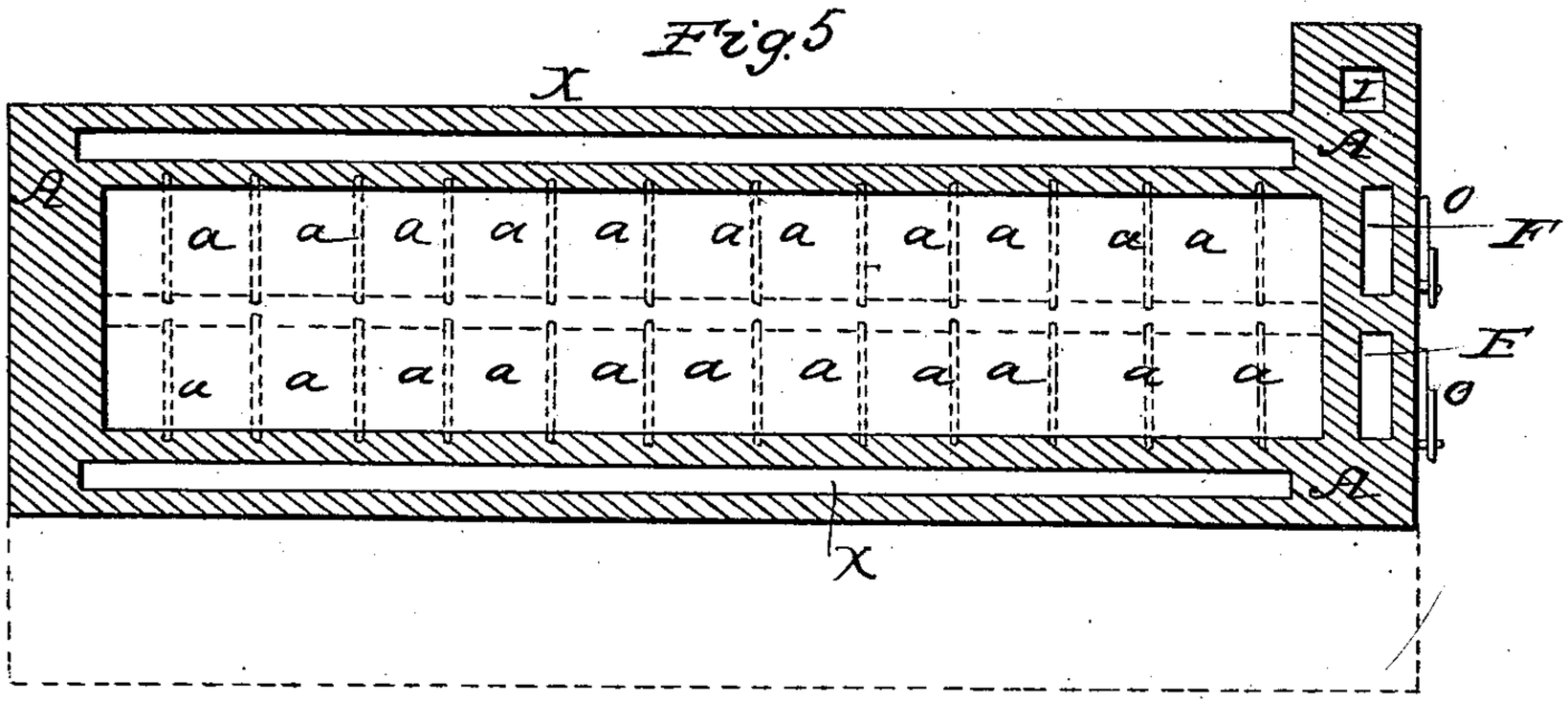


Fig. 5



UNITED STATES PATENT OFFICE.

NATHAN F. RICE, OF NEW ORLEANS, LOUISIANA.

BAKER'S OVEN.

Specification of Letters Patent No. 26,126, dated November 15, 1859.

To all whom it may concern:

Be it known that I, NATHAN F. RICE, of New Orleans, in the State of Louisiana, have invented certain Improvements in Bakers' Ovens; and I do hereby declare the following to be a correct description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of the oven; Fig. 2, an end elevation; Fig. 3, a rear elevation, the back of the oven being removed; Fig. 4, a ground plan; Fig. 5, a horizontal section, through line *x*, *x*, of Fig. 1.

The same letters is used in the drawings to indicate the same part wherever it occurs.

The nature of my invention consists in arranging a series of ovens on the different floors of a bakery, one above another, and heating them in succession by so directing the heat from the furnace or furnaces by means of flues that it shall pass successively under and over each oven, beginning with the lowermost, and ending with the uppermost; and in so arranging a series of dampers as to control the supply of heat to the several furnaces, at will, according to the requirements of the work to be done.

My invention further consists in combining in an oven of the character just described, means for coking the coal used as fuel, for burning the smoke, for confining the heat, for cleaning the flues, and for the more convenient and perfect inspection of the contents of the ovens, all as hereinafter more specifically set forth.

In the drawings, A marks the walls of the oven which are built of brick and are made hollow as shown in Fig. 5.

B marks the floors of the bakery which, in this instance, is three stories in height.

C indicates the ovens, three of which open, by two doors each, on each floor.

D is the furnaces from which the heat for all the series of ovens is derived.

E marks the fire bridges directly in rear of the furnaces; E′, the bridges in rear of the smoke chambers. Both pair of these bridges are built of brick work, and are adjustable vertically by means of screws or other equivalent means which raise and lower them as desired.

F are the flues through which the products of combustion pass to the chimney.

G marks the smoke chambers in rear of the furnaces; H, the hot air chambers; I, the chimney; K, the oven doors; L, a safety door opening outwards from chambers G; M, ashpit doors; N, sliding dampers controlling the communication between the flues F and the chimney; O, furnace doors; P, division wall between furnaces; Q, furnace back; R, back of smoke chamber; S, screws for raising and lowering the fire bridges; T, openings into the flues for the purpose of cleaning them; V, damper valves; W, damper handles; X, hollow spaces inclosed in the side walls of the oven for the purpose of confining the heat.

a marks the girders that support the iron floor and roof of the ovens.

The furnace doors should be made double to confine the heat more effectually. The same remark applies to the doors of the ovens. The grate bars should be made hollow, 1½ inch wide by 3 inches deep of $\frac{3}{8}$ths iron, stand upon edge and have a quarter inch opening. The air necessary to keep up combustion in the furnaces may be admitted through the ashpit doors M in the usual way; but I prefer to draw it from the hollow spaces X in the side walls. For this purpose, I shall admit the outward air to those spaces by an aperture near the top of the walls, and draw it off, after it becomes heated, by an aperture or conduit leading under the grates of the furnaces. The use of the hot air in this way will result in a saving of fuel; and the constant access of fresh cold air into the spaces X, will keep the wall cool, and greatly contribute to keep the temperature of the bakery at a moderate height.

Just back of the rear wall O of the furnace is the movable fire bridge E which is built of fire brick and is capable of being raised or lowered, by means of the screws S or other equivalent means, for the purpose of controlling the draft of the furnace, and rendering the combustion so gradual that the coal will be effectually coked during the process. The products of combustion, passing over the bridge E, enter the smoke chamber G. At the rear of this chamber is the wall R behind which and supported on one side by it, is the movable bridge E′ constructed and operated like bridge E. This bridge controls the size of the aperture from the smoke chamber G into the flues F. By making that aperture sufficiently small, nothing but flame will be allowed to pass, and the smoke will be completely consumed. The heated products of combustion having

passed from chamber G into the flue F may be allowed if desired, to pass at once to the chimney, the dampers V being so placed as to offer no obstruction to their passage. But if the upper ovens are to be heated, the dampers will be so arranged as to deflect the heat, and cause it to pass over the top of the lower oven in the direction indicated by the arrows. It next passes into chamber H and heats the bottom of the second oven C′. Then it escapes into the flue, and is again deflected across the top of the second oven. Passing into the second air chamber H′, it heats the floor of the uppermost oven C″, then passes over the top of that oven into the chimney I and thence escapes into the atmosphere. By a proper arrangement of the dampers the heated products of combustion may be made to heat either of the upper ovens without the other; or to pass by both if preferred.

The oven floors and roofs are of iron plate, supported by numerous transverse arched girders, properly tied across the chord, by iron rods passing through the walls. These rods also serve to tie the walls together. Tiles may be placed on the floors of the ovens, if preferred. In the rear wall of each oven, I make an aperture, near the top, controlled by a valve, the handle of which passes through and is worked at the front of the oven. This aperture is to allow of the escape of steam from the furnace, and it should be opened just before the door of the oven is opened for the purpose of inspecting the contents and ascertaining the progress of the baking. Without such an arrangement, the steam, which always fills the oven during the process of baking, would rush out with the heat at the door and prevent any satisfactory inspection of the interior. The valves of these apertures may also be arranged to operate as safety valves, preventing any dangerous accumulation of heat.

The course of the products of combustion before described, and indicated in the drawing by the red arrows, is that which they take when it is intended to heat all the ovens. If it is desired to pass the products of combustion direct to the chimney, the dampers are placed in such a position as to shut off the cross flues over the tops of the ovens, and direct the draft up the end flue into chamber H″, and through it into the chimney, as indicated by the black arrows.

The ovens on the three floors will be found to be heated unequally; the lowermost series being the hottest, and the uppermost being the least heated. The lower ovens will, therefore, be suitable for baking large bread, and the upper ones for lighter articles, such as biscuits and crackers.

Recent experience has directed attention to the economy in fuel and labor likely to result from the employment of ovens of great capacity, in the place of the numerous small ones now generally employed. The attempt, however, to work these large bakeries by machinery, has proved a signal failure; as no materials can be found to stand the sudden transitions of temperature to which machinery, working in such position, is necessarily exposed. An accident to the machinery, occurring in the midst of the baking operation, involves the partial, and often total, destruction of the contents of the oven, which, when it amounts to from ten to a hundred barrels of flour, is an item of loss which must more than counterbalance the supposed economy of the automatic operation.

I have endeavored, in the bakery hereinbefore described, to avail myself of the advantages of large ovens, while I avoid the great expense of construction and costly accidents, incident to mechanical ovens. I have greatly increased the economy of fuel by heating the draft, coking the coal, burning the smoke, and utilizing all the heat; while, by my peculiar combination of air chambers, flues and dampers, I have a control over the distribution of the heat not heretofore attained in ovens of such dimensions. The entire oven is intended to be 45 feet long and 14 feet deep, although I do not confine myself to any exact dimensions.

Having thus fully described my invention, I wish it to be understood that I do not claim any form of stove or oven for domestic use, my mode of construction being intended for bakeries on a large scale; neither do I claim any of the parts separately considered; but

What I do claim is—

The bakery hereinbefore described, constructed, arranged and operating as specified, the same consisting of a series of ovens placed on different floors of a building, and heated successively by products of combustion directed and controlled by the described combination of flues, dampers, and air chambers, arranged and coöperating as shown.

The above specification signed and witnessed this 30th day of December A. D. 1858.

NATHAN F. RICE.

Witnesses:
I. Hamilton Richey,
David Hughes.