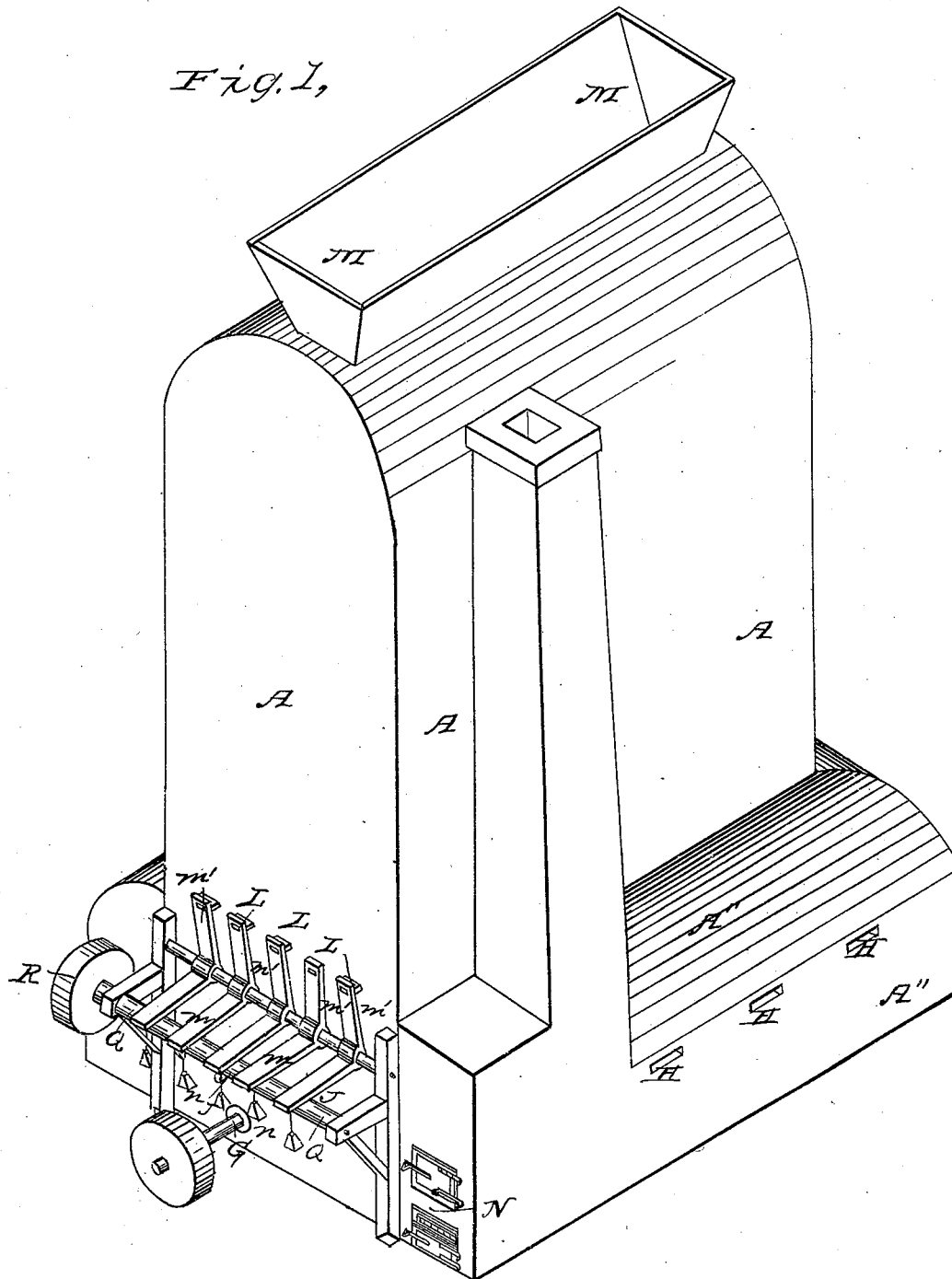


N. F. POTTER.  
Grain Drier.

No. 5,391.

Patented Dec. 11, 1847.

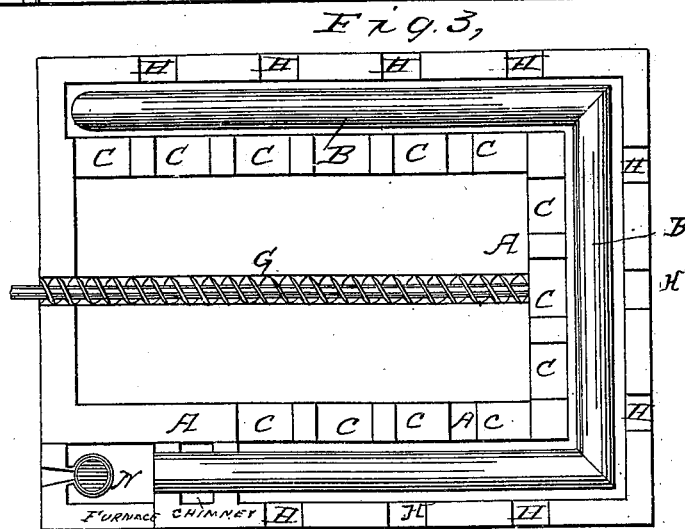
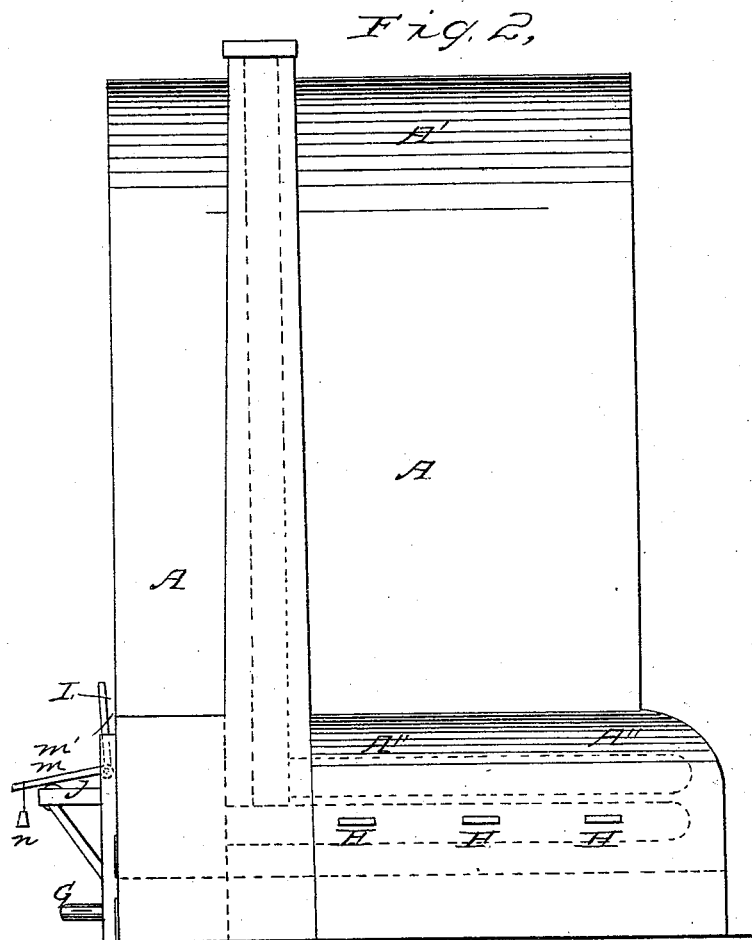


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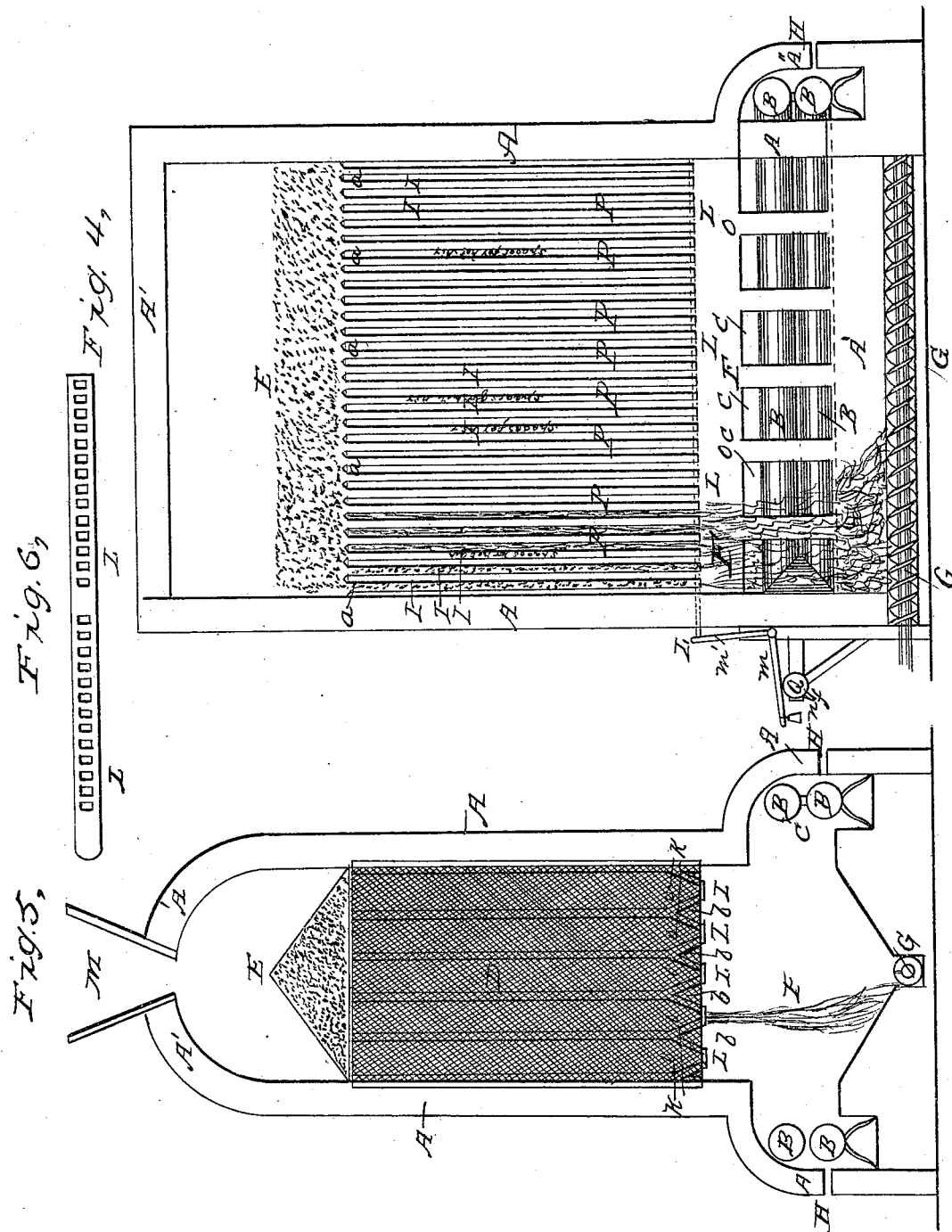
N. F. POTTER.

Grain Drier.

3 Sheets—Sheet 3.

No. 5,391.

Patented Dec. 11, 1847.



# UNITED STATES PATENT OFFICE.

NATHL. F. POTTER, OF PROVIDENCE, RHODE ISLAND.

## KILN FOR DRYING GRAIN.

Specification of Letters Patent No. 5,391, dated December 11, 1847.

*To all whom it may concern:*

Be it known that I, NATHANIEL F. POTTER, of the city of Providence, in the State of Rhode Island, have made a new and useful  
5 Improvement in the Manner of Constructing a Kiln for the Drying of Grain and other Articles of a Like Character; and I do hereby declare that the following is a full and exact description thereof.

10 I build my kiln of brick, or other suitable material, making it, usually, in the form of a parallelogram, which may be arched over, leaving an opening along its center for the feeding in of the grain, which is to pass  
15 down through narrow spaces situated between any number of double partitions the sides of which are formed of wire gauze, of perforated sheet metal, or of any other suitable material which will admit of being  
20 perforated over its whole surface so as to allow of the free passage of heated air through every part of them. These partitions are to be placed one or two inches, more or less, apart, and are to extend from  
25 side to side of the inclosing walls of the kiln. In the lower part of the kiln, below the bottom edges of the partitions, there is a fire chamber, or furnace, for heating the air by which the drying is to be effected.  
30 There are also flues of iron, or other metal, leading from the fire chamber to a chimney, and passing around the sides of the kiln; cold air from without being admitted through a number of openings in the walls, so as to  
35 come into contact with the flues, by which it is to be heated. This heated air is allowed to ascend through the spaces formed by the double partitions, from which it will pass through the meshes, or perforations, into the  
40 spaces through which the grain is allowed to descend, and thereby effect its drying.

The grain is not allowed to fall uninterruptedly from between the partitions, but is arrested by a number of vibrating valves  
45 which alternately open and close the spaces at the lower ends of the partitions; and when the grain has passed these it descends through the heated air chamber to the floor of the kiln, whence it is removed by means  
50 of a revolving conveyer.

In the accompanying drawing Figure 1, is a perspective view of the outside of the kiln. Fig. 2, is a side elevation of it; Fig. 3, a horizontal section of it, in the line  $x, x$ , of  
55 Fig. 2. Fig. 4, is a longitudinal vertical section through its middle, and Fig. 5 a vertical

transverse section between the double partitions, in one of the spaces through which the grain is to descend.

A, A, are the walls of the kiln, which is  
60 represented as arched over at A', A', and as having arched projections A'', A'', at its lower part for containing the air heating flues; along the arch, or top, there is a hopper shaped opening M, through which the  
65 grain is to be fed into the kiln.

N, Figs. 1, and 3, represents the furnace, or fire chamber, the smoke and heated air from which passes along metal flues B, B, that in part, surround the lower portion of  
70 the kiln.

In establishments where steam is used this may be made to pass through suitable tubes, and thus to heat the kiln, dispensing, of  
75 course, with the furnace. H, H, are openings in the side walls of the kiln for the admission of the external air which is to be heated by the flues B, and pass into the heated air chamber  $o, o$ , through openings  
80  $c, c$ , left in the walls A, A, for that purpose.

In Fig. 5, I, I, are the spaces between the double partitions, P, P; the grain, which is shown in a heap at E, passes down through the spaces I, I, and escapes at bottom as at F, while the heated air from the chamber  
85 O, O, passes up through the spaces, P, P, between the double perforated partitions. The spaces between these double partitions are closed at top, as at  $a, a, a$ , to prevent the entrance of the grain between them. The  
90 heated air passing up through these spaces escapes through the meshes, or perforated plates, and becomes thereby distributed among the grain that is to be dried, and finally, accompanied by the disengaged vapor,  
95 escapes through the mass E, at top.

In Fig. 3, D, shows one side of one of the double partitions, which is represented as covered with sheets of wire gauze, attached to its edges, and to ribs of wood  $b, b$ , by  
100 which it is sustained, and the two sheets of meshed, or perforated, material, is kept at the proper distance apart.

It will be manifest that were the grain allowed to pass down uninterruptedly  
105 through the spaces H, H, it would do so with a rapidity which would prevent the efficient action of the heated air upon it, and render the apparatus useless. To regulate the descent of the grain a series of sliding  
110 latticed valves is used, the face of one of which is shown at L, L, Fig. 6, and

which are seen in place at L, L, Figs. 1, 4, and 5. These are made to slide back and forth at the lower openings of the partitions, so as alternately to allow, and prevent, the escape of the grain.

In Fig. 1, Q, Q, is a shaft that is made to revolve by means of a whirl R, or in any other convenient way; upon this shaft there is a set of cams J, J, that act upon the kneed levers *m, m*, to which are attached the outer ends of the sliding valves L, L. The cams J, force the valves L, in, and they are retracted by means of the weights *n*, or by springs, or other analogous device. These valves cause the grain to descend by short successive stages through the narrow spaces I, I; and by the alternate opening and closing of the valves each kernel of the grain has not only a downward motion with the mass but is displaced, or jostled, at each successive stage of descent: so as to assume a different position relative to the others, thus effectually securing a uniform exposure of the whole to the hot air. By regulating the period of the revolution of the shaft Q, Q, the rate of the discharge of the grain may be made to correspond to the drying power of the kiln, so that the grain will be so long detained as is necessary to its complete desiccation. Should it be desired to prevent the rapid descent of the grain, and its too heavy pressure upon the valves, blocks of wood, or of other material may be made to occupy a part of the lower portion of the spaces I, I, as shown at *k, k*, Fig. 5. G, G, Figs. 3, 4, and 5, is a conveyor, of the ordinary construction, which is made to revolve for the purpose of removing the dried grain from the lower part of the kiln.

By means of the within described appa-

ratus a much larger quantity of grain may be operated upon at the same time, than on any other known plan, and a degree of heat lower than that usually required in such kilns, is rendered efficient, thereby obviating all danger of scorching, discoloring, or injuring the flavor of, the material.

Having thus fully described the nature of my improvement in the manner of constructing a kiln for the drying of grain, and of other articles of a like character, and shown how the same operates, what I claim therein as new and desire to secure by Letters Patent, is—

1. The manner herein set forth of arranging any number of double partitions formed by sheets of wire gauze, perforated metal, or other suitable material, through which heated air is allowed to ascend; in combination with similar spaces through which the material to be dried is allowed to descend, under an arrangement of parts substantially the same with that herein fully made known.

2. I claim also the alternately arresting, and allowing the descent of the grain through the spaces between the double partitions, this being effected by means of valves made to operate in the manner and for the purpose herein set forth; not intending, however, by these claims to limit myself to the particular form of the respective parts as described and represented, but to vary these as I may find convenient, while I attain the same end by a means substantially the same in principle and operation.

NATHANIEL F. POTTER.

Witnesses:

NATHANIEL SEARLE,  
JNO. H. EDDY.