S. MARSH.

Grain Drier.

No. 37,632. Patented Feb. 10, 1863.

Fig. 1,

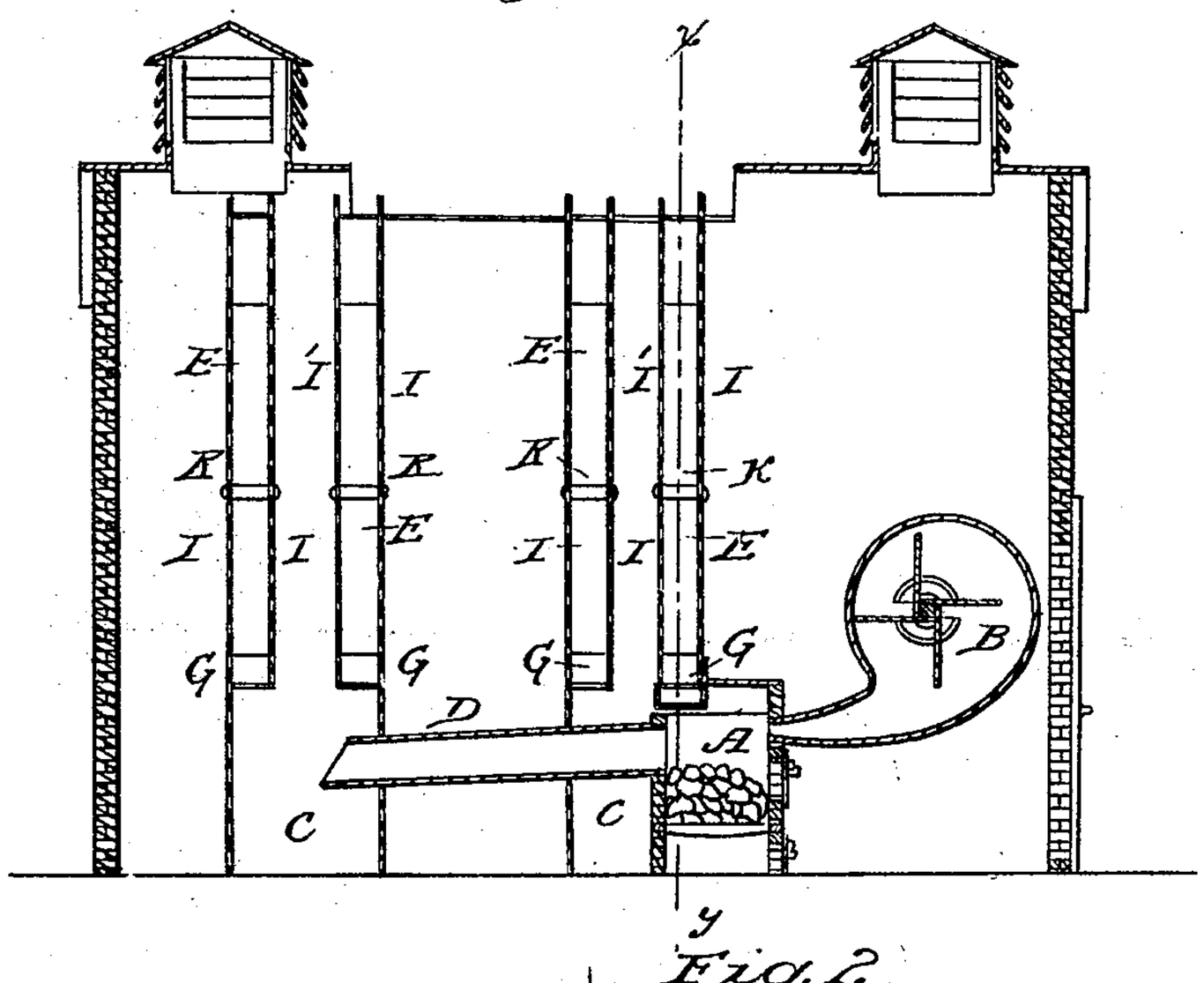
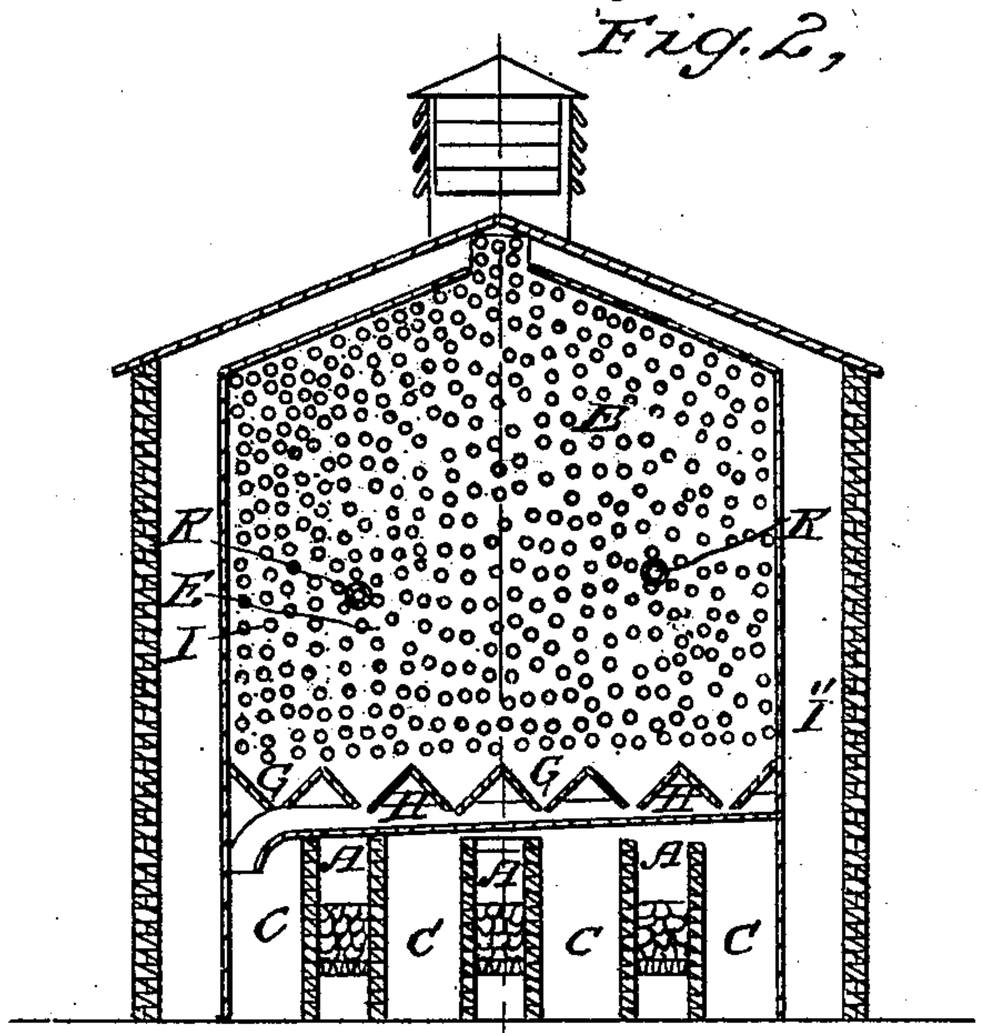


Fig. 2,



WITNESSES:

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UNITED STATES PATENT OFFICE.

SYLVESTER MARSH, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN APPARATUS FOR DRYING GRAIN, &c.

Specification forming part of Letters Patent No. **37,632**, dated February 10, 1863.

To all whom it may concern:

Be it known that I, SYLVESTER MARSH, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in the Method of Drying Grain, Flour, Malt, Broom-Corn, Hops, and other Similar Substances; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form part of this specification, and in which—

Figures 1 and 2 are, respectively, longitudinal and transverse sections, according to lines *x y* and *y z*, of a drier or an apparatus for drying grain, &c., constructed in conformity with the principles of my invention.

The present invention relates to a method of drying grain, hops, and other substances in which a current or blast of fresh air is forced over an open anthracite or coke fire and into and through the mass of grain or other substance to be dried, and for which Letters Patent of the United States were granted on the 13th day of January, 1863. In the said patent a horizontal table, made of perforated plate or wire-gauze, was employed, over which the grain or substance to be dried was spread in thin layers, and to which movement was imparted by stirring by hand or by mechanism to renew the contact of the particles with the blast of air heated as it passed over the fire. This mode of carrying out the invention patented to me on the said 13th day of January, 1863, involves extensive grounds if the drying operation be carried on a large scale, as the superficial area of the tables is to be increased in a direct ratio with the amount to be dried in a given space of time.

The object of the present invention is to obviate this disadvantage; and it consists in so constructing, arranging, and combining the apparatus as that with the same horizontal space or surface and without involving more time much larger quantities of grain may be dried than could be done heretofore, and I effect this by the employment, in combination with a blast of heated air, of vertical chambers, made of perforated iron plate or wire-gauze, substantially in the manner as hereinafter more fully shown and described.

To enable others to make and use my improved apparatus, I shall now proceed to describe its construction, arrangement, and operation.

In a suitable brick or other inclosure of convenient height and superficial extent, I erect one or more furnaces, A, adapted to the burning of hard or anthracite coal or coke. A forced supply of air is conveyed to and through the fuel by means of a fan-blower, or its equivalent, B, so arranged as that a constant blast of air may be passed tangentially over the fire, thus to produce a draft of air up through the fuel, which, together with the blast of fresh air, will be conveyed in a highly-heated condition through tubes to certain parts of the drying apparatus, as hereinafter to be explained. Each furnace may be provided with its own blowing apparatus, and all the fans may be mounted upon one and the same shaft, which in its turn may be driven by some prime mover, or but one blower may be used for all furnaces, and blast-pipes may be arranged to branch off from its mouth to terminate at the proper elevation above the grate of each furnace. Back of the furnaces are the hot-air receivers C, made of brick-work or sheet-iron or other suitable or convenient material. I prefer to make them closed or air-tight upon all their sides excepting the top, so that the hot air that is forced into them shall have no other escape than by passing upward through the top opening provided for its exit. The first receiver is built in immediate contiguity with the furnaces from which it receives its hot air. The other receivers, being located in rear of the first, are connected with the furnace, supplying each with hot air by means of one or more conveying-tubes or blast-pipes, D, as shown in Fig. 1. The hot-air receivers are surmounted by vertical drying-chambers E, made of perforated sheet-iron or wire gauze, and arranged in pairs for each receiver. These chambers are composed of sheet-iron walls, the front I and rear I′ of which are perforated and set about six inches apart by means of sleeves and bolts K and of side walls, I″, which may or may not be perforated. The latter I prefer to make in continuation with the side walls of the hot-air receivers, but this I do not deem indispensable, as any construction or arrangement whereby the hot air from the receiver is forced to rise up through the said chambers will answer the purposes of my in-

vention. The bottom of each drying-chamber is provided with a series of spouts, G, whose outlets may be made adjustable by means of slides or otherwise to regulate the descent of the grain in the chambers, thereby to expose it more or less to the action of the heated current of air. Underneath these spouts I arrange an inclined trough, H, to carry off the grain from the drier. The chambers may or may not be provided on top with hoppers to receive the grain. These and other details of construction will readily suggest themselves to those skilled in the art and require no further description.

From the above it will be seen that the great objections to the ordinary mode of drying grain, particularly in large cities where ground is expensive, representing a considerable portion of the investment, is successfully obviated. An apparatus constructed according to my invention will dry, with a great saving in fuel, ten times the amount of grain, corn, or other substance that which could heretofore be dried per square foot of ground, and an immense amount of labor or labor-saving machinery is economised, the grain requiring no stirring by hand or by machinery, but from the very nature of the apparatus is self-stirring, and continuous in its operation. The grain, it will be understood, is carried up by means of elevators and discharged into the chambers, which are always kept full, and runs out perfectly dried at the spouts into conveyers to elevators that carry it to its place of deposit. The grain is therefore a constantly-moving mass, and its motion may be retarded or accelerated at pleasure, as hereinbefore referred to. The body of the grain, being but six inches, or thereabouts, thick, is placed, as it were, on the edge, and can therefore be carried as high as deemed expedient. In this way but a small space on the ground is used, while the evaporating-surfaces are or may be increased more than tenfold.

I can have as many drying-chambers as may be found necessary by extending the hot-air pipe from the furnace, so as to discharge the heated air between any two grain-chambers.

Having thus fully described my invention, and the manner in which the same is or may be carried into effect, I would observe that I do not wish to be understood as confining myself to the precise construction and arrangement of the apparatus as hereinbefore shown and described, it being obvious that the same is susceptible of many modifications without departure from the principle of my invention; but

What I claim is—

The method herein described of drying grain, malt, hops, and other similar substances by the employment, in combination with an artificial blast of air over an anthracite coal or coke fire, as set forth, of upright drying-chambers composed of perforated plate, or its equivalent, and when arranged for operation substantially in the manner and for the purposes hereinbefore specified.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

SYLVESTER MARSH.

Witnesses:
P. H. WITT,
C. AFFELD.