T. COOK.

Heater and Drier.

No. 161,865. Patented April 13, 1875.

Fig. 1

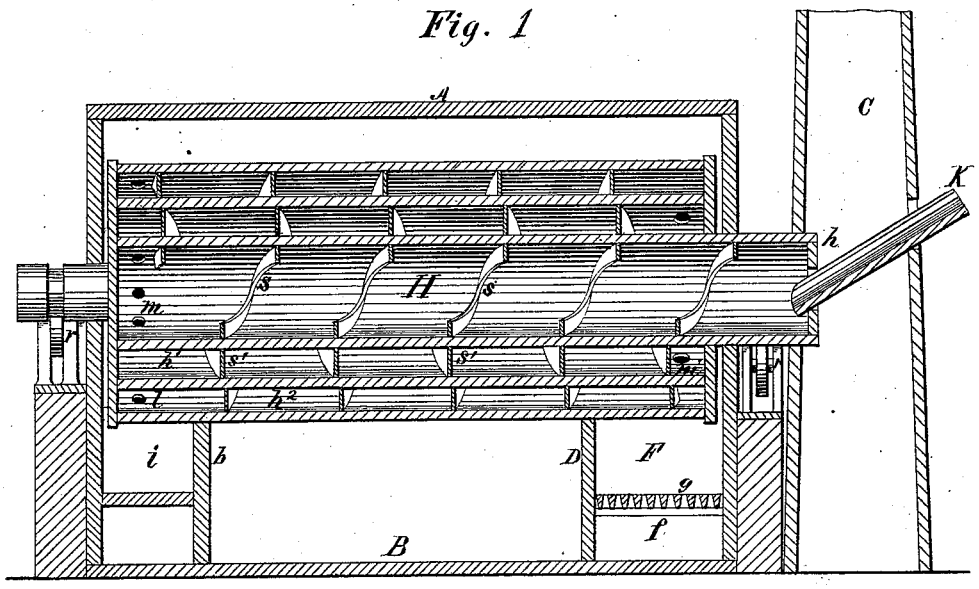
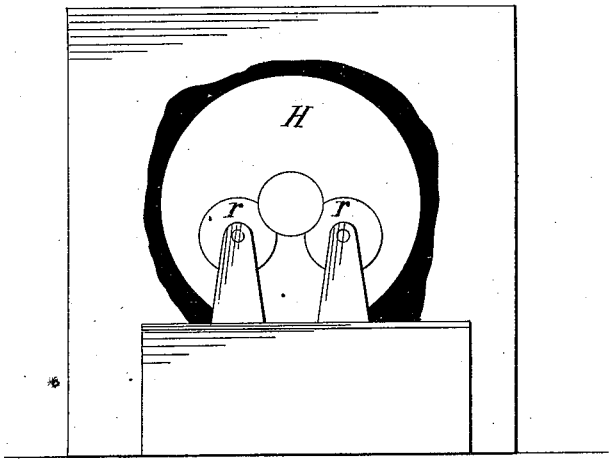


Fig. 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

THOMAS COOK, OF SING SING, NEW YORK, ASSIGNOR TO J. R. DOS PASSOS AND ZACHARIAH E. SIMMONS, OF NEW YORK CITY.

IMPROVEMENT IN HEATERS AND DRIERS.

Specification forming part of Letters Patent No. **161,865**, dated April 13, 1875; application filed February 24, 1875.

To all whom it may concern:

Be it known that I, THOMAS COOK, of Sing Sing, in the county of Westchester and State of New York, have invented a new and Improved Heating and Drying Apparatus; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings forming part of this specification, in which—

Figure 1 is a longitudinal vertical section of my improved apparatus; and Fig. 2 is a front elevation, with the inclosing-chamber partly broken away to expose the end of the drier.

Similar letters of reference in the accompanying drawings denote the same parts.

My invention has for its object to produce an improved apparatus for heating and drying granular substances, including all substances capable of being fed along through or by means of the screw-threads hereinafter described; and it consists in constructing a rotary heater of a series of concentric cylinders, and arranging screw-threads in the several spaces inclosed therein, so that the substance to be heated, being fed to the interior of the central or smaller cylinder through an opening at the front end thereof, shall be forced along, by the screw-threads referred to, to the back end of said central cylinder, and discharged therefrom into the end of the next surrounding cylinder, where it shall, by a similar conveyer-screw arranged therein, with the thread running in the opposite direction, be forced back to the front end of this second cylinder, and discharged therefrom into the front end of the next surrounding cylinder, wherein it is forced along by a similar screw, until the material passes into the space between the two outermost cylinders, and ultimately arrives at, and is discharged from, an opening or series of openings adapted for the purpose. The heater, constructed of this nest of communicating cylinders adapted each to receive and forward the material, is arranged to be rotated in an inclosing combustion-chamber or furnace, or hot-air chamber, which imparts to it the necessary heat, and may also be adapted to receive the products of combustion from the combustion-chamber or the hot air from the hot-air chamber, and transmit the same through said interior spaces along with or over the material to be heated, and finally discharge such products of combustion or hot air into the escape-flue at one or the other end of the heater. The screw-threads are attached to the concentric cylinders, and the only rotation they have is that derived from the rotation of the heater.

In the drawings, F represents the fire place or furnace, having grate-bars *g*, ash-pit *f*, and door *d;* and B represents a solid brick foundation, provided with a bridge-wall, *b*. The whole is arched over, as shown at A, forming the heating-chamber, in which rotates the heater H. The material is fed into the heater by means of a suitable feed-chute, *k*, and is delivered therefrom at suitable openings *l l*, whence it falls upon the inclined floor *i*, and runs off by a lateral passage into suitable receptacles. The hot air, or, as shown in this form of furnace, the heated gases, smoke, &c., evolved from the burning fuel in the chamber F, pass around and over the heater H, and enter said heater at the holes *l l*, finally escaping from the heater through the hollow shaft or journal *h* into the chimney C. The heater is supported upon friction-rolls *r r r r*, and is driven by means of suitable gearing.

The internal construction of the heater will be readily and clearly understood from Fig. 1. The heater being rotated in the proper direction, the materials supplied from the chute *k* are forced along through the central space *h* by the screw-threads *s*, and delivered at *m* into the next surrounding space h^1, in which, by the action of the screw-threads *s'*, they are forced back to the point *m'*, where they are delivered into the next surrounding space h^2, and so on till they arrive at and are discharged from the openings *l l*. There may be a greater or less number of spaces, *h* h^1 h^2, with their contained screw-threads, for conveying the material along, according to the nature of the substance to be treated. The material may be discharged, if preferred, at the end of the heater nearest to the fire-grate, in which case suitable provision must be made to receive and convey away the heated and dried material.

This form of heater gives the advantage of

utilizing a very great proportion of the heat, a part thereof being conducted through the walls of the cylinder, and a portion being imparted directly to the material by the heated air and gases in their passage through the cylder, and, if radiated, immediately taken up by the adjoining chambers, and there applied to the drying and heating of the material, the current of moving gases, &c., meanwhile carrying off the steam and vapors evolved from the substances under treatment. The material is kept constantly moving through the heater, and is thoroughly dried during its passage, so as to be discharged in a constant and uniform stream, ready for immediate use.

I claim as my invention—

In an apparatus for heating and drying pulverulent and granular substances, the combination of the furnace F, inclosing arch or jacket A, escape-flue C, and feed-chute K with the rotary cylinder H, operating within the jacket A, said cylinder being divided into several compartments, h h^1 h^2, provided with screw-threads s s', and with openings m m' l, arranged at opposite ends of the compartments, and forming, with the said compartments, the passage through which the material to be dried passes from the feed-chute to the incline i, and through which, also, the smoke and products of combustion pass from the furnace F to the escape-flue or chimney C, substantially as described.

THOS. COOK.

Witnesses:

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