No. 650,012.

Patented May 22, 1900.

T. B. HOWE.

DRIER.

(Application filed Feb. 14, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

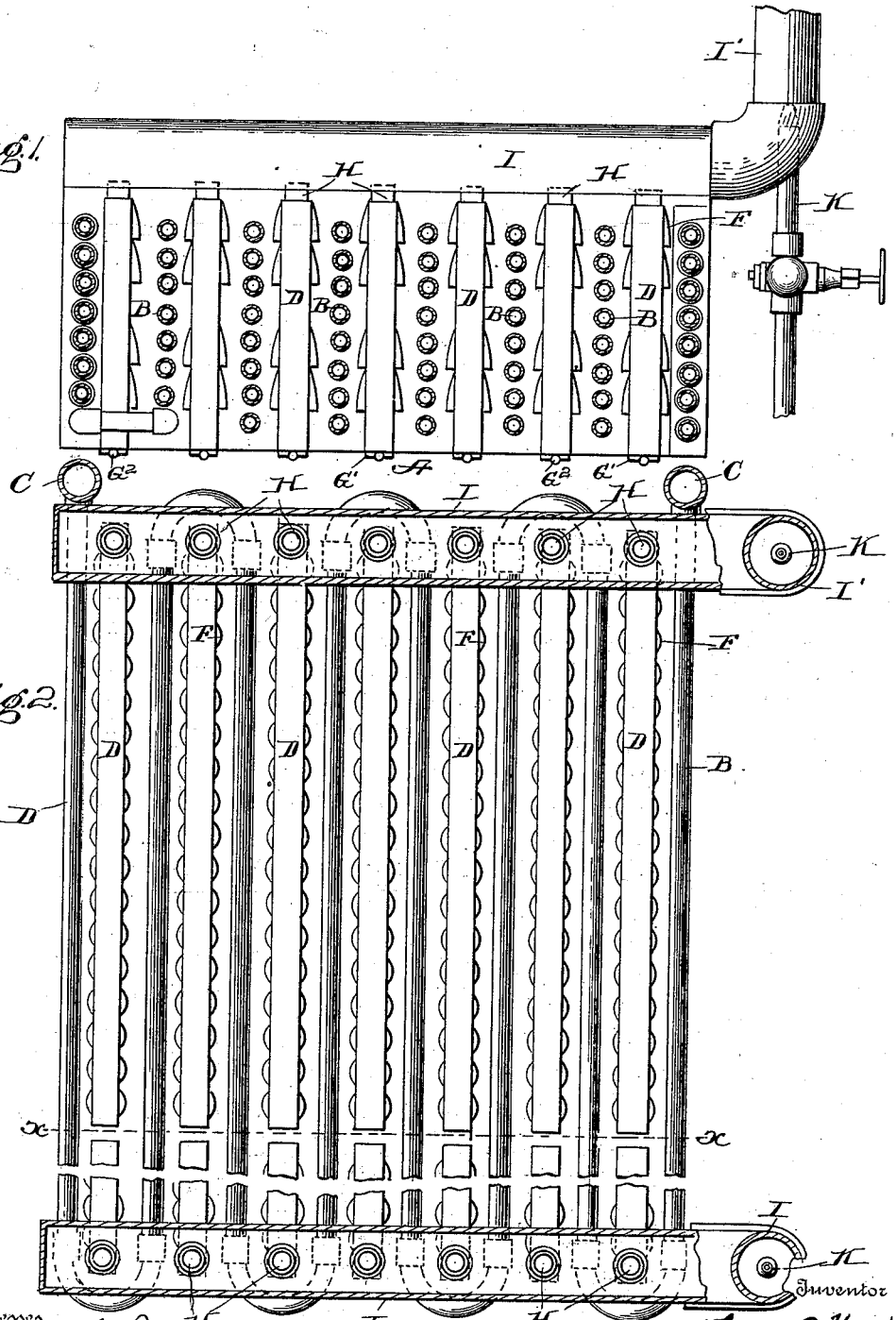

Fig. 2.

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Fig. 3.

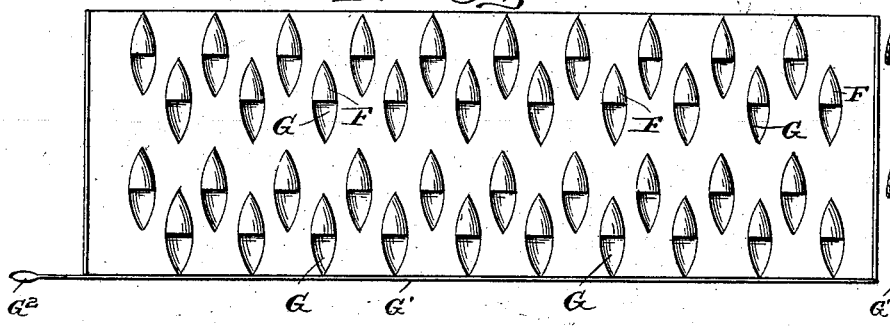


Fig. 4.

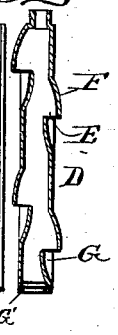
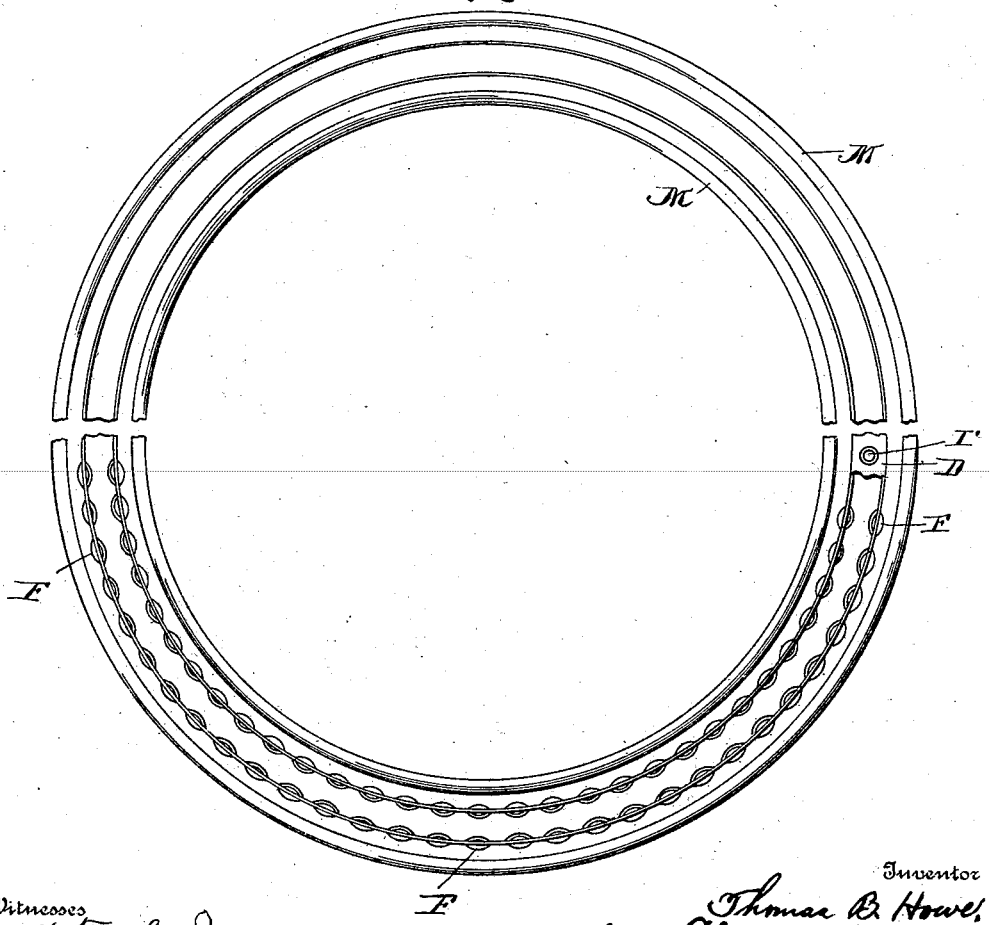


Fig. 5.



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UNITED STATES PATENT OFFICE.

THOMAS B. HOWE, OF SCRANTON, PENNSYLVANIA, ASSIGNOR TO THE HOWE MANUFACTURING COMPANY, OF SAME PLACE.

DRIER.

SPECIFICATION forming part of Letters Patent No. 650,012, dated May 22, 1900.

Application filed February 14, 1900. Serial No. 5,177. (No model.)

To all whom it may concern:

Be it known that I, THOMAS B. HOWE, a citizen of the United States, and a resident of Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Driers; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

This invention relates to improvements in driers, and in the particular embodiment which I shall use for illustrating the invention it is designed more especially for drying sand and like granular substances for use in making plaster or for sanding railroad-tracks to prevent the slipping of the wheels of the locomotive.

The invention has for its object to provide a simple and highly-efficient device through which the sand may be passed continuously and which will draw the moisture-laden air from the same without checking the feed of the material and without danger of becoming clogged by the bridging of the particles in the apparatus.

The invention consists in certain novel details of construction and combinations and arrangements of parts, all as will be now described and the particular features of novelty pointed out in the appended claims.

Referring to the accompanying drawings, Figure 1 is a vertical section through an apparatus embodying my present improvements, the air-chambers being shown in end elevation, the section being as though taken on the line *x x*, Fig. 2. Fig. 2 is a top plan view partially broken away and with the main air-pipes in section. Fig. 3 is a detail side elevation of one of the air-chambers. Fig. 4 is a vertical section through the same, and Fig. 5 is a top plan view and partial elevation of a modified form of apparatus.

Like letters of reference in the several figures indicate the same parts.

According to my improved invention a suitable chamber or hopper is provided, into the top of which the sand or other material being dried may be shoveled or placed, such material being allowed to gravitate down through the drying-chamber and to be discharged from the bottom thereof in any desired or preferred manner.

In said drawings the letter A indicates a rectangular inclosure having arranged in it heating-pipes B, preferably extending back and forth and arranged in vertical series, so as to present vertical passages between the pipes, through which the sand or material to be dried can gravitate downwardly. The pipes B may be connected together by manifolds C for convenience in making the steam connections, and a sufficient space is left between the several coils of pipe to permit of the insertion of vertically-arranged air-chambers D. These air-chambers are of such thickness as to leave relatively-narrow spaces between their side walls and the heating-pipes, through which spaces the sand passes.

In devices of this kind where the material to be dried is subjected to a relatively-high heat it is essential that provision should be made for drawing off the moisture-laden air or steam from the material and that every particle of the material should be exposed, so that its moisture can readily escape, and as a further object to accomplish this result during the shortest possible travel of the material. In accordance with my present invention each of the air-chambers D is provided with a series of apertures, through which the moisture-laden air or steam may find ready entrance, and the entrance of sand or other material being dried is prevented by overhanging portions of the side walls of the air-chambers. Referring particularly to Figs. 3 and 4, it will be seen that the air-chambers are provided on each side with alternating rows of entrance-apertures E, each in the form of a substantially-horizontal opening located beneath an outwardly-projecting overhang F. These overhangs F are pointed at their upper ends, so as to divide the sand easily and prevent any clogging action, and in order to still further enlarge the entrance-apertures E immediately beneath said apertures the wall of the air-chamber is recessed, as at G, the recess being a counterpart of the overhang F, but extending in the opposite direction and with its pointed portion downward instead of upward.

Obviously the side walls of the air-chambers may be formed by casting or by striking up the recesses and overhangs from sheet metal, and the chambers are preferably closed at the bottom by dampers G′ and are also closed at the top with the exception of suitable exit-passages H, adapted to be put into communication with an air-main I, usually located at each end of the drier. The dampers G′ are of ordinary construction, consisting simply of sliding plates having openings therein, operated by means of handles G^2, as will be readily understood. The air-mains I preferably extend to a suitable draft-creating device which will draw off the moisture-laden air and create a current or currents of air through the several chambers. In the preferred apparatus the draft-creating device is in the form of a steam jet or nozzle K, directed into the base of the uptake I′, although obviously other well-known forms of draft-creating devices may be employed. By means of the dampers G′ the currents of air created by the draft-creating device may be caused to flow through the air-chambers through the openings in the sides instead of up through the bottom of the chambers, thus drawing the moisture and vapor through the sides of the chambers with much more force and materially increasing the drying capacity of the apparatus.

Obviously the particular shape of the air-chambers employed is immaterial, as they may be curved, in which instance the shape of the drying apparatus will be circular, as indicated in Fig. 5, er they may be rectangular, as shown in the other figures of the drawings. Where the drying apparatus is circular, as in Fig. 5, the heating-pipes M are also preferably arranged in circular form and the air-chambers between adjacent series of pipes.

In action the sand gravitating down through the apparatus is naturally controlled in its rate of feed by the most constricted portions of the passage through which it passes, and the most constricted portions of the passage are represented by the spaces between the overhangs or projections and the heating-pipes. Hence as the sand passes each of these points it is allowed to loosen up and flows back into the recesses G, at which time a very large surface will be exposed for the ready escape of moisture, and by forming a large number of overhangs and recesses the sand is effectually dried in a very shallow apparatus, or, in other words, the sand may be dried with such an apparatus in advancing a relatively very short distance, a result which could not be accomplished without provision were made for allowing the sand to spread out freely at the points where the moisture is drawn off.

Obviously the particular size of the overhangs and recesses is immaterial, and while they may be relatively long, even extending the whole length of the air-chambers, yet I prefer to employ independent and relatively-small overhangs and apertures, inasmuch as by these means the sand is more completely subdivided, and each portion being stirred or deflected out of its straight path is more effectually subjected both to the action of the heating-pipes and the air passing up through the air-chamber.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States of America, is—

1. In a drying apparatus, the combination with a vertical system of heating-pipes, having vertical passages between them for the passage of the material to be dried, of an air-chamber located in said passage and having alternating overhanging portions and recessed portions with entrance-apertures beneath said overhanging portions for the escape of moisture from the material being dried; substantially as described.

2. In a drying apparatus, the combination with a system of heating-pipes, arranged in vertical series leaving passages between them, of a system of vertical air-chambers arranged in said passages, and having alternating series of overhanging and recessed portions in their side walls with entrance-apertures between said overhanging and recessed portions for the entrance of moisture; substantially as described.

3. In a drying apparatus, an air-chamber having its side walls formed with the alternating overhanging and recessed portions with entrance-apertures between the lower edges of the overhanging and upper edges of the recessed portions; substantially as described.

4. An air-chamber for drying apparatus, having its side walls formed with the overhanging projections pointed at their upper ends, and recessed portions beneath said overhanging projections pointed at their lower ends, and air-entrance apertures between the lower edges of the overhanging portions and upper edges of the recessed portions; substantially as described.

5. In a drying apparatus, the combination with the series of heating-pipes having vertical passages between them, a series of air-chambers in said passages with entrance-apertures in the side walls of said air-chambers, air-mains with which said air-chambers are in communication an exhaust apparatus for creating a current of air through said chambers, and dampers located in the bottom of the air-chambers; substantially as described.

THOMAS B. HOWE.

Witnesses:
CHAS. L. HAWLEY,
MARY GALLAGHER.