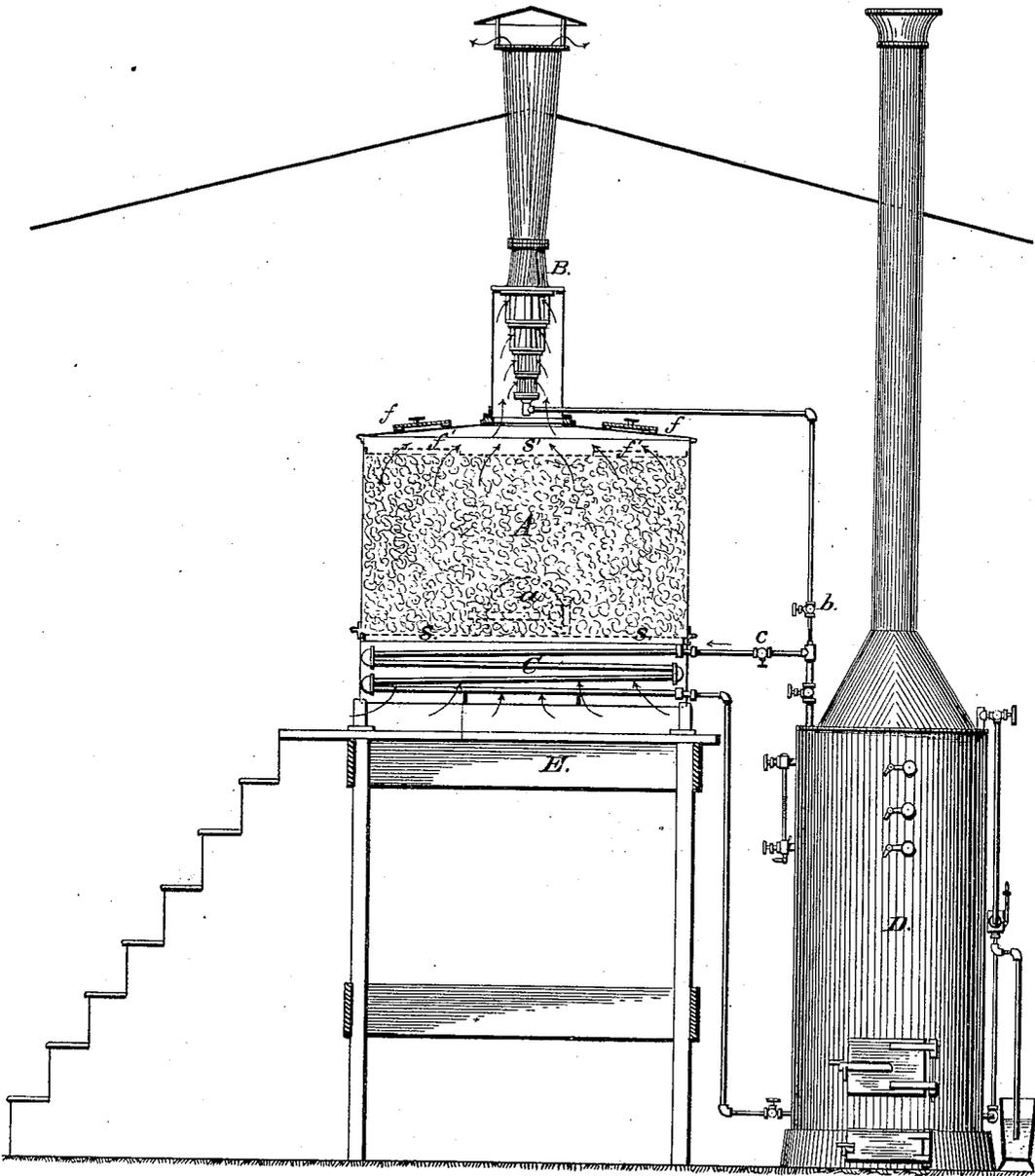


(No Model.)

H. SCHOLFIELD & L. SCHUTTE.
Drying Apparatus.

No. 238,531.

Patented March 8, 1881.



Witnesses
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UNITED STATES PATENT OFFICE.

HENRY SCHOLFIELD, OF GUATEMALA, CENTRAL AMERICA, AND LOUIS SCHUTTE, OF PHILADELPHIA, PENNSYLVANIA; SAID SCHUTTE ASSIGNOR TO SAID SCHOLFIELD.

DRYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 238,531, dated March 8, 1881.

Application filed September 15, 1880. (No model.)

To all whom it may concern:

Be it known that we, HENRY SCHOLFIELD, of Guatemala, Central America, and LOUIS SCHUTTE, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Drying Apparatus, of which the following is a specification.

Our invention relates to that class of drying apparatus wherein a body or receiver to hold the material is used in connection with a steam-jet exhauster to cause the passage of air through the body; and the invention consists in the combination of the steam-jet exhauster with a steam-radiator to heat the air, and a steam-boiler connected with both the exhauster and the radiator, whereby an automatic regulation of the temperature in the receiver is secured, as hereinafter described, and in details which will be more fully explained.

The drawing represents an elevation of our improved apparatus, showing the casing or body in section.

The object of our invention is to provide means whereby granular or fibrous substances may be dried in bulk without agitation or stirring, and without dividing the mass into separate layers.

To this end we construct the casing or body with a perforated bottom or screen, to support the material and to permit air to enter and pass up through the same, and with a top or cover which may be closed air-tight, with the exception of a central opening communicating with the jet apparatus, the receiving space or chamber being free from obstructions of any kind. When intended for operating upon light material, liable to be carried up by the draft of the air, a second screen is placed above the receiving-space. The cover or top of the chamber is made air-tight, with the exception above noted, but is furnished with openings through which the material may be supplied, leveled, and compacted, as is also the upper screen when used. The top and screen are both provided with means of closing the openings mentioned, the former being adapted to seal the top against the admission of air. The

heater is preferably located directly beneath the receiving-chamber, in a downward extension of the casing, but may be placed elsewhere, provided it be made to communicate with said chamber by a closed trunk or passage. The jet apparatus and the heater receive steam from one and the same boiler.

Referring to the drawing, A represents the body or casing, having a tight cover or top communicating by a central opening with a steam-jet exhauster, B, and provided with openings for the admission of the material to be treated, said openings being furnished with close-fitting covers or doors *f*, by which to close them against the admission of air. The casing or body is furnished with a wire screen or perforated bottom or diaphragm, *s*, said casing being preferably extended below the same, as shown, to form a chamber or housing for the heater C, which consists of a steam-pipe coiled or carried back and forth therein, and, by preference, connecting at both ends with a steam-boiler, D, at different levels. The drier, with its heater, is mounted upon an elevated platform, E, in order that the water produced by condensation in the steam-heating pipe may flow back to the boiler.

As will be seen by referring to the drawing, the jet apparatus or exhauster B and the heater C connect with the same boiler D, valves *b* and *c* being furnished, to regulate the supply of steam to the two, respectively.

It will also be observed that a second screen or perforated diaphragm, *s'*, furnished with openings having covers *f'*, is represented in the drawing directly above the space occupied by the material to be treated, and that a door, *a*, closes an opening through the side of the casing or body A at the lower part of the receiving-chamber. This screen is intended to prevent the air-current from carrying the material, when of a light or fibrous character, into the jet apparatus, while the door is designed to permit the removal of the contents of the chamber.

If the apparatus be intended to operate only on granular substances, not liable to be carried off by the air-current, the upper screen, *s'*,

may be omitted, though it will not in any way interfere with the action of the apparatus if retained.

The apparatus being thus constructed and arranged, and the casing or housing of the heater being so mounted as to permit the free entrance of air from below, the operation is as follows: The material or substance to be treated is supplied to the receiving-chamber through the openings in the top, the door *a* being closed, and through the openings in the upper screen, if used, and is leveled, or, if necessary, compacted, in order that the interstices and spaces between the particles may be uniform throughout. The covers are then applied and the valves *b* and *c* opened, thus admitting steam from the boiler *D* to the exhaustor *B* and heater *C* simultaneously. The exhaustor *B* creates a suction through the central opening in the top of the casing, thereby drawing air upward through the mass of material in the receiving-chamber, said air entering at the bottom of the casing, passing upward in contact with the steam-heating pipes, and being thereby dried and heated, thence through the perforated bottom or screen and through the material, and finally out through the exhaustor.

The valves *b* and *c* will be adjusted in starting the apparatus so as to establish a certain general relation between the amount of steam passing to the heater and the amount supplied to the exhaustor; but this may vary, and is not a matter of importance.

In treating most substances, however, it is important that a certain temperature shall not be exceeded. To maintain uniformly the desired temperature automatically, and without in any way depending upon attendants, and under variations in the boiler-pressure and other changes liable to occur about the steam-generating apparatus, we have arranged the parts as above described, supplying the exhausting device and the heater from the same boiler. The effect of this arrangement is a far more perfect regulation and control of the temperature than can be attained by any other means of which we are aware, as we will now explain.

The amount of steam condensed in the heater will depend entirely upon the amount of air drawn through it, which acts as the condensing medium. If, now, the steam-pressure should rise above the average, a greater volume of air will be drawn by the exhaustor, and a consequently larger volume of air will have to be heated by the heater, thereby keeping its temperature the same as it was at normal steam-pressure, whereas if the volume of air drawn had remained the same as at normal steam-pressure, its temperature would have

been increased and perhaps have injured the material treated. This heating of the increased volume of air has also the effect of increasing the consumption of steam in the heater, so that in a few minutes the steam-pressure will be brought to that point which can be maintained by the boiler. It will thus be seen that the regulation of the temperature is entirely automatic, and that the effect of varying steam-pressure consequent upon the nature of the fuel, attention, or other causes will be compensated for simply in time of drying. The apparatus serves the same purpose also as would a safety-valve applied to the boiler.

It is apparent that the direction in which the air is made to travel, the form and construction of the heater and exhaustor, and the materials employed in construction may be varied, that a blast may be employed instead of suction, and that other modifications of details may be made. The construction and arrangement shown and described is, however, preferred, and an exhaustor of the well-known Körting type is found very efficient. Other forms of exhausting device operated by steam may, however, be employed.

We are aware that air has been drawn through a body containing wheat by means of a steam-jet exhaustor, and that it has been proposed to admit hot or cold air or steam directly into said body or receiver in contact with the grain, the means by which the air was to be heated not being stated.

Our invention relates to an apparatus wherein the air is heated by means of steam-radiators, and in which the radiator and the exhausting apparatus are supplied with steam from their common source, and is confined to an apparatus wherein the steam is prevented from coming in direct contact with the grain or other material under treatment.

Having thus described our invention, what we claim is—

1. The combination of a body or receiver, a steam-jet apparatus to produce a current of air through the same, a steam-radiator to heat the air entering the body, and a steam-boiler connected with both the exhaustor and the radiator, whereby an automatic regulation of the temperature in the body is secured.

2. The combination of the body or receiver, the jet-exhaustor at its top, the steam-radiator in its base, and the steam-generator connected with both the exhaustor and the radiator.

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