

(No Model.)

J. G. SANDERSON.
DRIER.

No. 474,305.

Patented May 3, 1892.

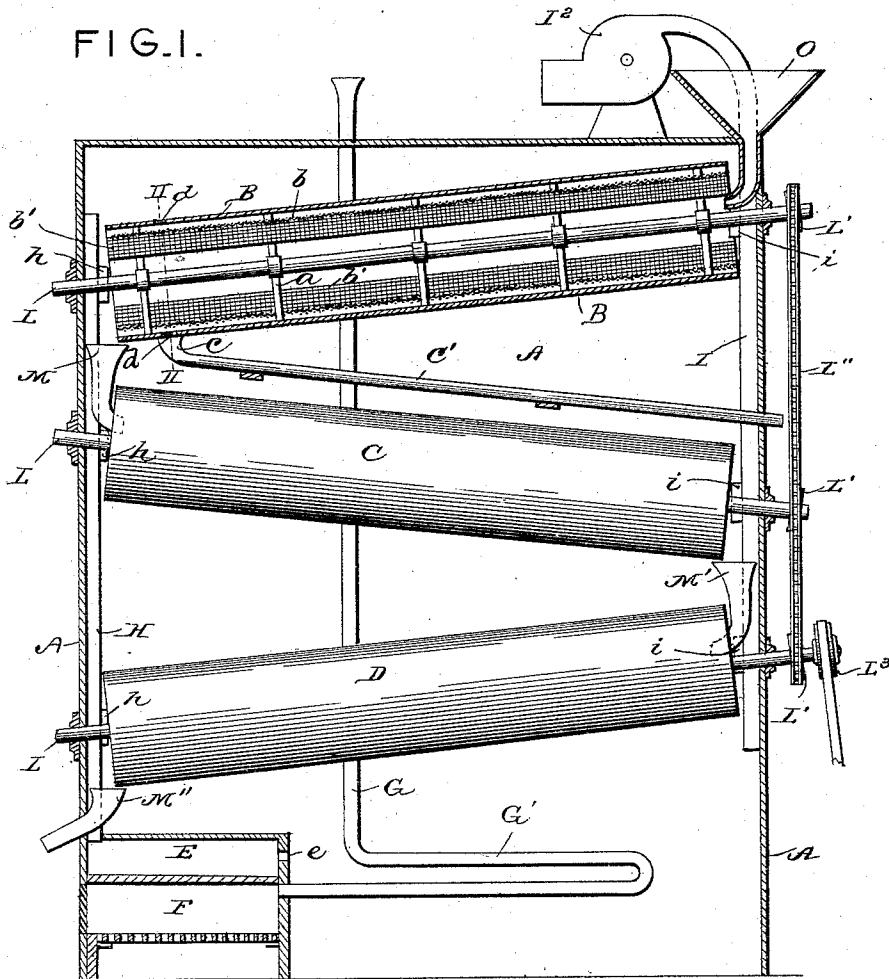
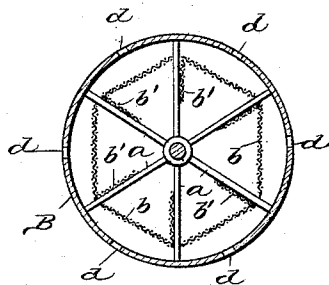


FIG. II.



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DRIER.

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Application filed February 12, 1891. Serial No. 381,227. (No model.)

To all whom it may concern:

Be it known that I, JAMES GARDNER SANDERSON, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Driers for Brewers' Grains and other Matter, of which the following is a full, clear, and exact specification.

My invention relates to driers for brewers' grains and other matter, and more particularly to an apparatus which is especially adapted for curing or drying brewers' grains and similar substances, which when wet are compact and difficult to treat in the usual manner; and my invention consists in certain features of novelty hereinafter described in connection with the accompanying drawings, and particularly pointed out in the claims.

In said drawings, Figure I is an illustration of my invention, partly in vertical section; and Fig. II is a detail sectional view taken on the line II II, Fig. I.

In carrying out my invention I employ a suitable casing or chamber A, in which are arranged any desired number of revoluble open-ended cylinders B C D. These cylinders are preferably supported one above the other upon shafts L, having suitable bearings in the side walls of the chamber A and provided at their outer ends with sprocket-wheels L', connected together by a suitable chain or belt L'', whereby they may be driven from any suitable source of power applied to the pulley L³. The cylinders are inclined in opposite directions, so that the water of condensation or moisture will gradually run off at their lower ends as they rotate, and each cylinder is provided with an inner perforated or wire-gauze lining or tube *b* of hexagonal or other polygonal form in cross-section, so as to form spaces between the lining or tube and the cylinder, through which the heat may pass, and thus heat the mass within the tube at bottom as well as at top. The spaces thus formed not only permit the hot air to penetrate to all parts of the grains from the outside of the tube, but they also constitute passages for draining off the water of condensation and moisture not vaporized. The linings or tubes are also inclined, so that the grains or other material will gradually work out at their lower ends as they rotate with the cylinders, and

the interiors of these linings or tubes *b* are provided with a number of longitudinal radial perforated or wire-gauze flanges, wings, or agitators *b'*, supported therein by means of the radial arms or spokes *a*, which also support the cylinders on their respective shafts. These agitators are located at the outer ends of the spokes or radial arms and keep the material in constant agitation, scattering it in a comminuted state before the current of hot air as the grains gradually work toward the lower end of the upper tube to enter the next and undergo a similar treatment. At the upper end of the top tube is arranged a feed-hopper O, having a neck or chute passing a short distance into the end of the upper tube, and at the lower end of the same tube is arranged a chute M, having an enlarged mouth adapted to catch the material as it discharges from the upper tube and convey it into the tube of the cylinder C below. At the lower end of the cylinder C is likewise arranged a similar chute M' for feeding the material into the next tube in the cylinder D, and the tube of the cylinder D is arranged to discharge into a chute M'', from which the material discharges into any suitable receptacle ready for use.

On the floor of the chamber A is situated the furnace F, from which extends the smoke-flue G, the latter being provided with a suitable number of return-bends G', situated within the heating-chamber A, so as to further utilize the heat of the products of combustion for heating the chamber A. Arranged over the furnace F is an air-heating drum E, having an air-inlet *e* from the chamber A and from which extends a hot-air flue H, having short necks *h*, extending into the ends of the tubes for supplying the latter with hot air. At the opposite ends of the tubes is arranged an exhaust-flue I, having short necks *i*, extending into the ends of the tubes for drawing off the vapor, and connected to the upper end of this flue I is a suitable exhaust-fan I².

The material when first introduced into the upper tube is often so wet that a portion of the moisture runs off without being vaporized; and for this reason I have provided this upper cylinder near its lower or discharge end with a number of leak-holes *d*, adapted

to discharge into a trough *c*, from which the water is carried off by pipe *c'*. The largest diameter of the lining or tube *b*, it will be seen from Fig. II, is less than the diameter of the interior of the cylinder, so as to leave a free passage for the water and prevent the latter from again soaking into the grains as the cylinder rotates.

Instead of providing the cylinder with the holes *d*, the same object may be accomplished by extending the perforated lining or tube slightly beyond the end of the cylinder, so that the lining or tube will discharge the grains into one receptacle while the water runs out at the end of the cylinder into another receptacle or trough.

It will of course be understood that the number of the cylinders may be increased or diminished at pleasure without departing from the spirit of my invention. For some purposes one extra long cylinder supported on rollers might answer; but I prefer to employ a number of short ones, as shown, as in the latter case each is supplied with a fresh current of air and condensation of the vapor within the cylinder is less liable to take place.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination of the inclined shaft having radial arms, the cylinder for collecting the water of condensation, mounted upon the outer ends of the arms and discharging the water of condensation at its lower end, the inner perforated tube or wire-gauze lining through which the grains or wet mass of material is passed, mounted upon the outer portions of the arms, leaving air-spaces between the cylinder and the tube or lining, and the longitudinal radial perforated flanges or wire-gauze wings for shifting the grains or

wet mass on the inner surface of the tube or lining, mounted upon the arms contiguous to the tube or lining, the inner tube or lining extending beyond the portion of the cylinder where the water of condensation is discharged, substantially as described.

2. The combination of the inclined shaft having radial arms, the cylinder mounted upon the arms, the inner perforated tube supported by the arms out of contact with the cylinder, leaving air-spaces between the tube and cylinder and having longitudinal radial perforated flanges or wings secured to the arms on the inner sides of the tube, a hot-air chamber within which the cylinder rotates, a feed-hopper discharging into the upper end of the tube, a furnace located within the chamber having a hot-air drum, a hot-air flue connected with the drum and having a short neck extending into the lower end of the tube, an exhaust-fan, a flue connected with the exhaust-fan and having a neck extending into the upper end of the tube, and means for rotating the shaft, substantially as described.

3. The combination of a hot-air chamber, an inclined shaft mounted in said chamber, having radial arms, the cylinder mounted upon the arms, the inner perforated tube supported by the arms out of contact with the cylinder, leaving air-spaces between the tube and cylinder and having longitudinal radial perforated flanges or wings secured to the arms on the inner side of the tube, and the discharge-trough having a pipe by which the water is carried off from the discharge end of the cylinder, substantially as described.

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Witnesses:

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