No. 649,376. Patented May 8, 1900.

J. WATERHOUSE.

DRIER.

(Application filed Jan. 29, 1900.)

(No Model.)

Fig. 1.

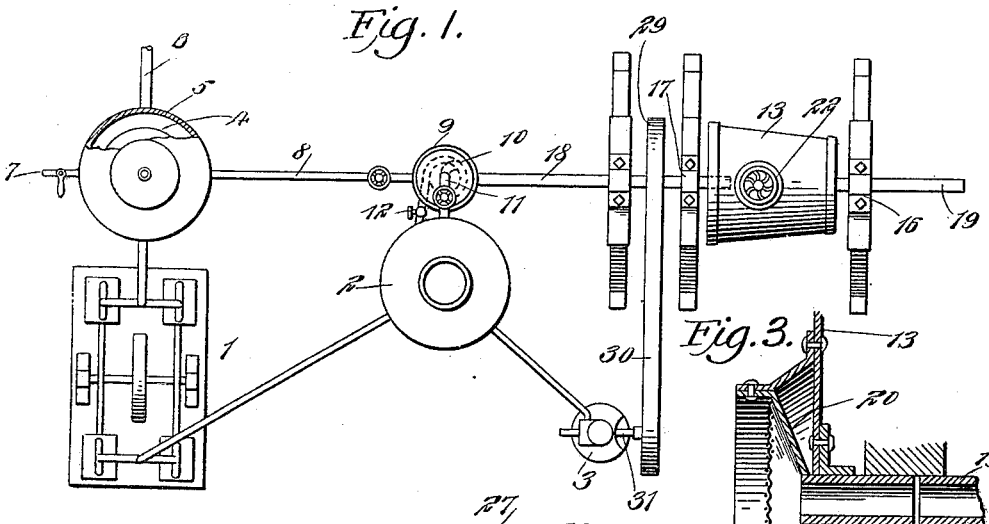


Fig. 3.

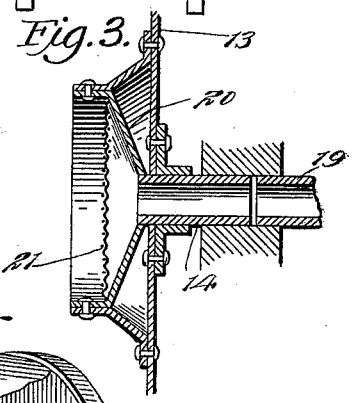


Fig. 2.

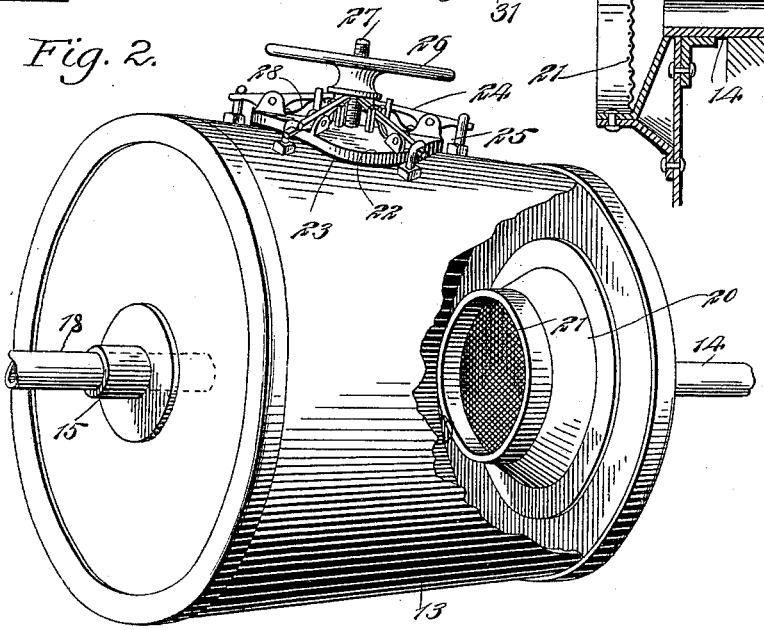
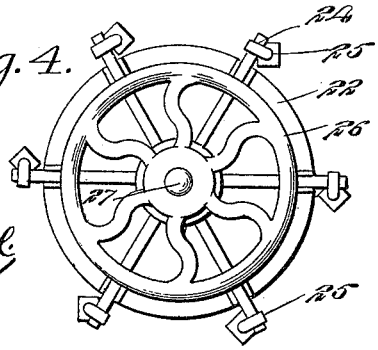


Fig. 4.



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DRIER.

SPECIFICATION forming part of Letters Patent No. 649,376, dated May 8, 1900.

Application filed January 29, 1900. Serial No. 3,198. (No model.)

To all whom it may concern:

Be it known that I, JOHN WATERHOUSE, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Drier, of which the following is a full, clear, and exact description.

This invention relates to improvements in machines for drying fruits, meats, sand, and detritus or earthy matter containing precious metals or gem stones; and the object is to provide a machine of this character that shall be simple in construction and made rapid and effective in its operation by the use of dry air for absorbing and carrying away the moisture and like material contained in the matter operated upon.

I will describe a drier embodying my invention and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of a drier embodying my invention. Fig. 2 is a perspective view of a tumbler employed, a portion being broken away to clearly show the interior thereof. Fig. 3 is a section of one end of the tumbler, and Fig. 4 is a plan view of a cover for the tumbler.

Referring to the drawings, 1 designates an air-compressor operated in any suitable manner, but here shown as having connection with a boiler 2, which also has operative connection with a small engine 3. The compressor 1 forces air into a receiving-tank 4, surrounded by a jacket 5, the space between the jacket 5 and the receiver 4 being designed to receive water from a pipe 6 for cooling the receiver, whereby the moisture in the compressed air is precipitated and collected at the bottom of the receiver, from which it may be drawn, as required, through a valve-controlled pipe 7. A valve-controlled pipe 8 leads from the compressed air receiver or holder to a reheating-vessel 9, in which a coiled pipe 10 is arranged, which at the upper end connects by a valve-controlled pipe 11 with the upper portion of the boiler 2, and a tube 12 connects the lower end of said coiled pipe with the lower portion of the boiler. This lower tube 12 may also be provided with a valve, so that the steam-pressure passing through the pipe 10 may be regulated.

A tumbler 13, made in the form of the frustum of a cone, has tubular journals 14 15, mounted to rotate in journal-boxes 16 17. Communicating with the tubular journal 15 is a pipe 18, leading from the reheater 9, and the tubular journal 14 communicates with a take-off pipe 19, leading to a discharge at any desired point. The hollow journal 14 communicates at its inner end with a funnel 20, attached to the small end of the tumbler 13, and across the inner side of which is arranged a sieve 21.

For an opening through the wall of the tumbler 13 a plate-like cover 22 is provided. Between the cover 22 and the surface of the tumbler is a gasket 23, of rubber or similar soft material, to make an air-tight connection between the cover and tumbler. The cover is locked in position by means of series of levers 24, pivoted to lugs extending upward from the cover, the outer ends of said levers being adapted to engage with hooks or keepers 25, attached in any suitable manner to the tumbler. The inner ends of the levers 24 engage against the under side of a hand-wheel 26, movable on a screw-rod 27, extended upward from the cover 22. Obviously by running the hand-wheel 26 downward on the screw-rod the levers will be rocked to move the cover in tight connection with the tumbler.

When it is desired to remove the cover, the wheel 26 is to be moved upward on the screw-rod, and springs 28, engaging the under sides of the inner portions of the levers, will cause the inner ends to move upward with the hand-wheel, while the outer ends move downward, so as to be easily disengaged from the hooks or keepers 25.

Connected to the journal 15 of the tumbler is a pulley 29, from which a band 30 extends to a pulley on the shaft 31 of the engine 3. The pulley 29 may be counterbalanced at the side opposite that of the cover 22, so that the tumbler will rotate evenly.

The operation is as follows: Assuming that builder's sand is damp or wet and contains a quantity of earthy matter which it is desired

to remove, the cover is to be removed from the tumbler and the tumbler partially filled with the sand, and then the cover is replaced. The compressed air is now allowed to flow from the receiver or holder 4 to the reheater 9, the flow being regulated by the valve in the pipe 8. The small engine is set in motion, which causes the tumbler to revolve at any required speed suitable for the purpose. The dry heated air passes through the fixed pipe 18 and the hollow journal 15 and enters the tumbler, absorbing the moisture contained in the sand and carrying it away through the screen 21, the hollow journal 14, and the pipe 19. When the sand has been sufficiently dried, then the earthy matter in the shape of dust is blown out through the pipe 19 by the air-compressor. In this way the sand will be more thoroughly cleaned, which is very desirable for concrete and cement mortar. In like manner in placer-mining when the detritus contains gold, tin, or other material along with soil and fine sand the material after being suitably cleaned is to be placed in the tumbler, where the air-force passing through the tumbler will carry with it the sand or like material, leaving the valuable or heavy material in the tumbler.

If there are gem stones mixed with earth and fine sand and gravel, the earth and fine sand may be dried and blown out, leaving the gravel, in which the gem stones may be seen and picked out. By placing a proper screen 21 in the exit or funnel 20 and allowing a strong pressure of air to enter the tumbler the gravel stones will be set in such motion and whirled around, rubbing against each other, as to become worn and polished by attrition, so that a gem can easily be detected and picked out.

Fruit, such as apples and peaches, properly pared and cut; cherries, stoned or unstoned; meat with the bones removed and cut into strips; grapes, prunes, and currants—in fact, fruit and meat of all kinds properly prepared and selected may be dried and cured by this apparatus and then packed in suitable cans and boxes for army and navy and pocket use.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a drier, a rotary tumbler made in the form of the frustum of a cone, an inwardly-extended funnel at the small end of the tumbler, and a sieve material arranged in said funnel, substantially as specified.

2. In a drier, a rotary tumbler in the form of the frustum of a cone, tubular journals for the said tumbler, means for directing hot air through one of said journals, a funnel within the tumbler at its small end and with which the other tubular journal communicates, a fixed pipe registering with said other tubular journal, and a sieve material arranged within the funnel, substantially as specified.

3. In a drying-machine, an air-compressor, a boiler having connection with the compressor, an engine having steam connection with the boiler, a receptacle for receiving air from the compressor, the said receptacle having a jacket to receive a heating medium, a heating vessel, a coil in said heating vessel having engagement at its upper and lower ends with the upper and lower portions of the boiler, a tumbler for the material to be dried or operated upon, and having pipe connection with the heater, the said tumbler being longitudinally tapered, a funnel in the smaller end of said tumbler, a sieve in said funnel, and a driving connection between the tumbler and the engine, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN WATERHOUSE.

Witnesses:
ALFRED W. TROTTER,
JOHN G. VAN HORNE.