

J. H., A. Q. & A. J. REYNOLDS.
AUTOMATIC FRUIT-DRIER.

No. 187,905.

Patented Feb. 27, 1877.

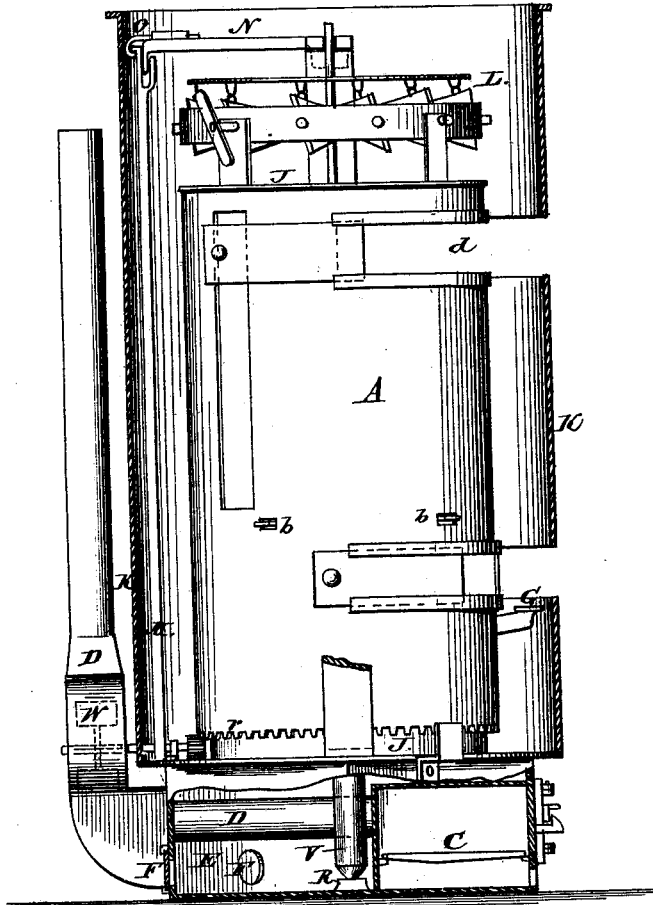
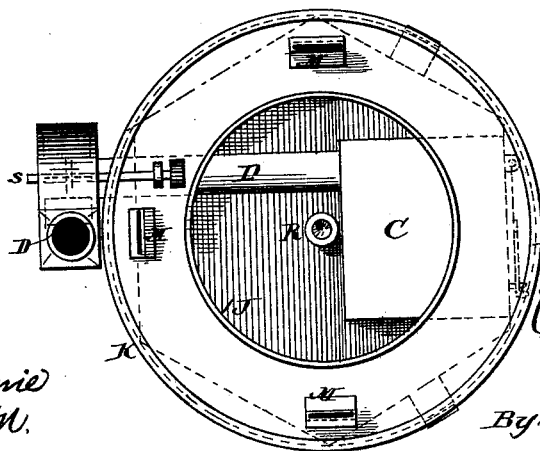


Fig. 1.

Fig. 2.



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Fig. 3.

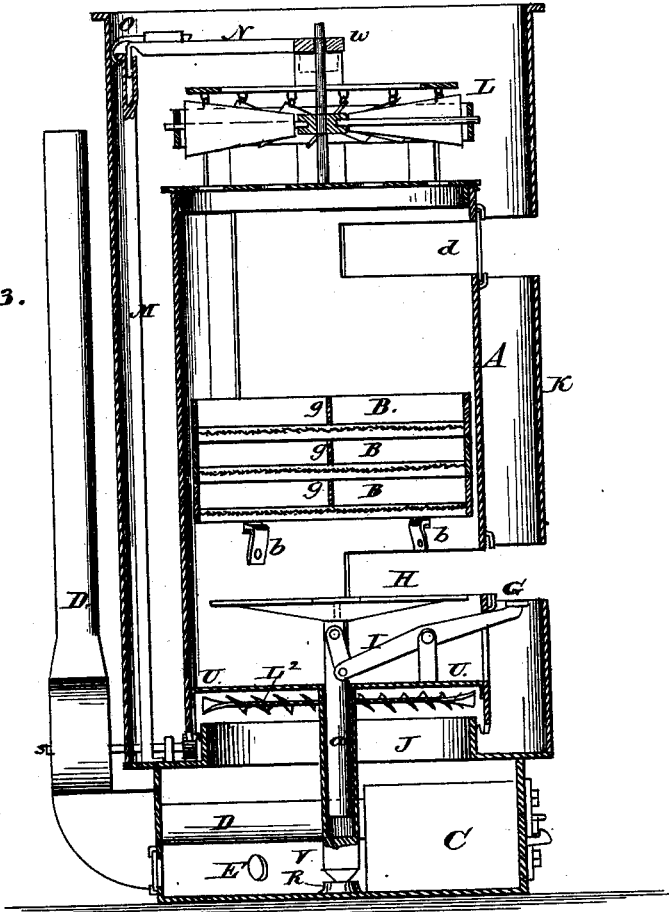
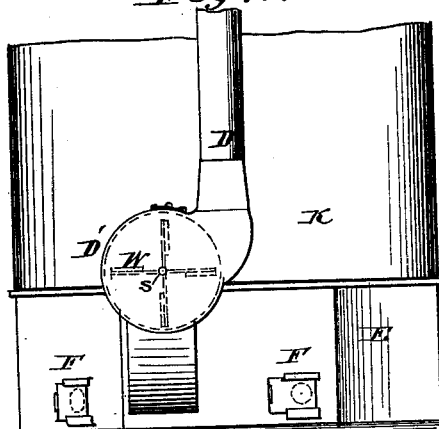


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN H. REYNOLDS, ASA Q. REYNOLDS, AND ANDREW J. REYNOLDS, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN AUTOMATIC FRUIT-DRIERS.

Specification forming part of Letters Patent No. 187,905, dated February 27, 1877; application filed February 16, 1877.

To all whom it may concern:

Be it known that we, JOHN H. REYNOLDS, ASA Q. REYNOLDS, and ANDREW J. REYNOLDS, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Fruit-Driers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings and to the letters of reference marked thereon.

Figure 1 is a partial section and elevation of a machine embodying our improvements. Fig. 2 is a plan view of the lower portion thereof. Fig. 3 is an axial section, showing the means employed for elevating the fruit-trays. Fig. 4 is a rear elevation, showing the location of the fan-wheel in the smoke-stack.

Like letters of reference in all the figures indicate corresponding parts.

Our improvements relate to that class of fruit-driers wherein artificial heat is employed to complete the process of drying, and the invention consists in certain combinations and arrangements of parts, all of which will be hereinafter fully described and then pointed out in the claims.

A is a cylinder or chamber, in which the fruit-trays B B, &c., are located, and C is a fire-box, from which the necessary artificial heat is derived, and which may be of any approved form or construction. In the illustration chosen the smoke-pipe D passes rearward through the hot-air chamber E, and thence upward a sufficient height to afford the requisite draft. The top of the air-chamber E is provided with a circular opening, J, surrounded by the cylinder A, through which the currents of heated air pass to their exit-openings in the top of said cylinder. A suitable step or gudgeon, R, in the base of the air-chamber, receives a pivot, V, upon which the cylinder A is supported through the medium of the arms U U, or their equivalents; and over the cylinder a fan or wind-wheel, L, is placed, being so connected with said cylinder that the two shall revolve together.

When the fire is burning, the heated air passes up through the interior cylinder, carrying the moisture from the fruit with it, and

impinges upon the blades of the fan-wheel, causing it to revolve, and through it the cylinder and its contained trays. This revolution of the cylinder and its trays exposes the fruit to the passing air in a very thorough manner, and thus accomplishes the drying more effectively and evenly than is done in other styles of driers.

The machine being self-operating recommends itself over those revolving driers heretofore constructed, not only on account of its extreme simplicity and cheapness, in consequence of dispensing with the revolving machinery, but also for the reason that its motion is automatically regulated. If the currents of heated air be very rapid and strong the revolutions of the cylinder will be proportionately numerous, and thus the fruit will be carried into contact with the dry air in such a manner as to charge it all with moisture, permitting none to pass off without doing its required work. If the currents be feeble, the correspondingly slow motion of the trays compels the fruit thereon to remain a longer time in contact with the heated air; and from these considerations it is obvious that the most economical consumption of fuel is attained.

Over the mouth of the air-chamber is placed a deflecting-plate, L², which serves to force the ingoing currents of air toward the walls of the cylinder, and thus secure more uniform distribution of air among the fruit. The edges of this plate are formed something like a fan-wheel, in order that all the force of the current of air may be utilized to turn the cylinder, said plate being attached to or connected with said cylinder. The smoke-pipe outside the air-chamber is enlarged, as at D', to form a casing for the wheel W, which is revolved by the ascending smoke, and the shaft of this wheel carries a pinion, which meshes into a rack, r, formed in or attached to the lower portion of the cylinder A. A revolution of the wheel W, it is evident, will cause the corresponding revolution of the cylinder. As an adjunct to the wheel L this wheel W assists greatly in keeping the fruit-trays in motion, and it may be omitted in the lighter and more

easily-operated driers if so desired. The pivot V is made hollow to receive the standard *a*, which carries the tray-bed H and serves to elevate the trays. This standard is elevated or depressed by means of an ordinary foot-lever, I, projecting through a suitable slot in the cylinder. It (the lever I) may be replaced by a pinion engaging with a rack upon the standard, and capable of being operated from without by simply turning a hand wheel or crank.

The foot-lever is illustrated as being located within an exterior casing (to be hereafter described) but it is our intention, if it be found desirable, to arrange this lever, or its equivalent, so that it may be operated from without this exterior casing. This may be readily accomplished by so hanging the lever that it may be dropped down and project through a suitable slot in the exterior casing after the revolving cylinder is brought to the proper position, and in case the rack and pinion above mentioned be adopted a removable wrench may be applied to operate the same under like conditions or position of the cylinder A. The trays with their fruit are inserted through a door, G, and rested upon the tray-bed H. When the fruit is sufficiently dried in this position the tray is elevated by operating the standard *a*, and is caught and sustained by the springs *b b*. When the cylinder above the springs is full, and the process of drying carried sufficiently far, the trays are removed through a suitable door or opening, *d*, at top. Under ordinary circumstances the drier is made to operate continuously by inserting a fresh tray as soon as one is removed from above.

The fruit-trays have perforated bottoms to permit the air to pass through, and, in order that one may rest upon the other without touching the fruit, are each provided with right-angled cross division plates or braces *g g*, upon the top of which the bottom of the tray above may rest. These braces serve to give the requisite rigidity and strength to the trays, which, from the arrangement shown, are compelled to support a considerable weight, and, also, while the trays are in motion, to force the currents of air to take a circular direction, thus causing a more even distribution of said currents through the drier, and in consequence a more thorough and complete drying of the fruit. Heretofore it has been found difficult to prevent the ascending heated air from following certain channels opened by the rapidly-drying fruit, which usually occurs at or near the center of the trays, leaving the outer portions comparatively uncured. With these division-plates in the revolving trays they (the trays) may be made of any desirable form or size, and the difficulty alluded to completely avoided.

The vertical axis of the cylinder may be sustained above in any suitable way.

As shown in the drawings, it is carried by a box, *w*, located in the cross-bars N N, which

are removably secured to the standards M M, three in number, rising from the top of the air-chamber. This arrangement of the standards exposes one-half of the revolving cylinder free from interference by a standard or post, so that the trays, which are nearly equal in diameter to the cylinder, may be easily and conveniently inserted or removed.

At O O we have shown a slide-fastening adapted to connect the cross-bars N N to the standards M M in such a manner that they can be easily separated, when desirable, for shipping or packing and for repairs.

The blades of the fan-wheel L are pivoted, as clearly indicated, so that they may be operated by the person in charge of the drier, and thus the speed of the cylinder brought under perfect control. A suitable brake may be applied to arrest its motion when necessary to insert or remove a tray, or the same thing may be accomplished by simply turning the blades of the fan to a vertical or horizontal position.

The inlet of fresh air is controlled by a dampered opening, (one or more,) conveniently located in the side of the air-chamber, as at F F, Fig. 4; and the openings through which the trays are inserted and removed may, if found desirable, be closed by suitably-arranged doors.

The exterior casing hereinbefore alluded to is represented at K, and is there shown as resting upon the top of the air-chamber. It is provided with openings corresponding to *d* and G in the revolving cylinder, through which the trays are removed and inserted. Its office is to confine the heat about the revolving cylinder, preventing its radiation, and thus more effectually utilize the heat from the furnace or fire-box. It may be made of wood or metal, and should be capable of being easily removed, for which purpose it may be elevated by suitably-arranged tackle or other contrivance, or may be constructed in hinged or jointed sections.

We are aware that a fruit-drier has heretofore been caused to revolve by means of weights, springs, &c.; and we are also aware that fruit-trays have been elevated successively from bottom to top of the drier by various contrivances. To these particular features we desire it understood that we lay no claim; but,

Having now fully described our invention, what we do claim as new, and desire to secure by Letters Patent, is—

1. A fruit-drying cylinder located above and in combination with an air-heating chamber, and caused to revolve by the heated-air currents, substantially as set forth.

2. The standard *a*, carrying the tray-bed, and adapted to be operated by means substantially as described, in combination with the hollow pivot V, which supports the revolving cylinder, as set forth.

3. In a fruit-drier, the combination, with the standards M M, of the removable cross-

pieces N N, adapted to sustain the vertical axis of the revolving cylinder, substantially as shown and described.

4. In a revolving fruit-drying tray provided with a foraminated bottom, the cross-plates *g* *g*, serving to deflect the ascending currents of heated air, in the manner and for the purposes explained.

5. In combination with a revolving fruit-drier, carrying a series of trays, as described, and provided at or near its lower portion with a rack or series of teeth, a fan-wheel, located in the smoke-pipe thereof, and having a pinion upon its projecting shaft, for the purpose of engaging with said rack or teeth, the whole being arranged to operate substantially as shown and described.

6. In combination with a revolving fruit-drier, a fan-wheel located above the same, and provided with adjustable fans, by opening or closing which the motion of the drier may be arrested or regulated, as hereinbefore described, and for the purposes explained

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

J. H. REYNOLDS.
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Witnesses:

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