

H. E. BIDWELL.

Fruit-Drier.

No. 163,968.

Patented June 1, 1875.

Fig: 1.

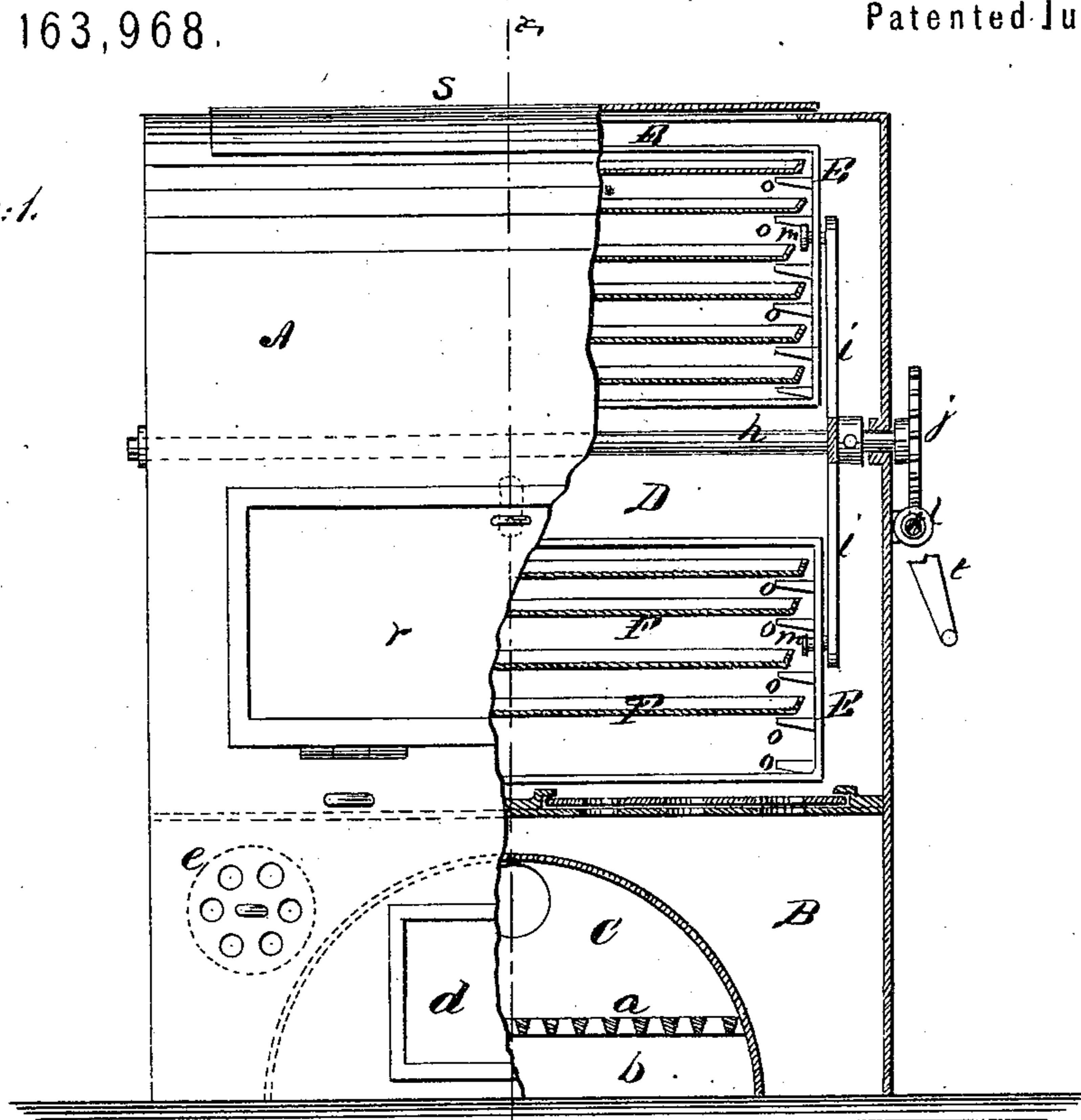
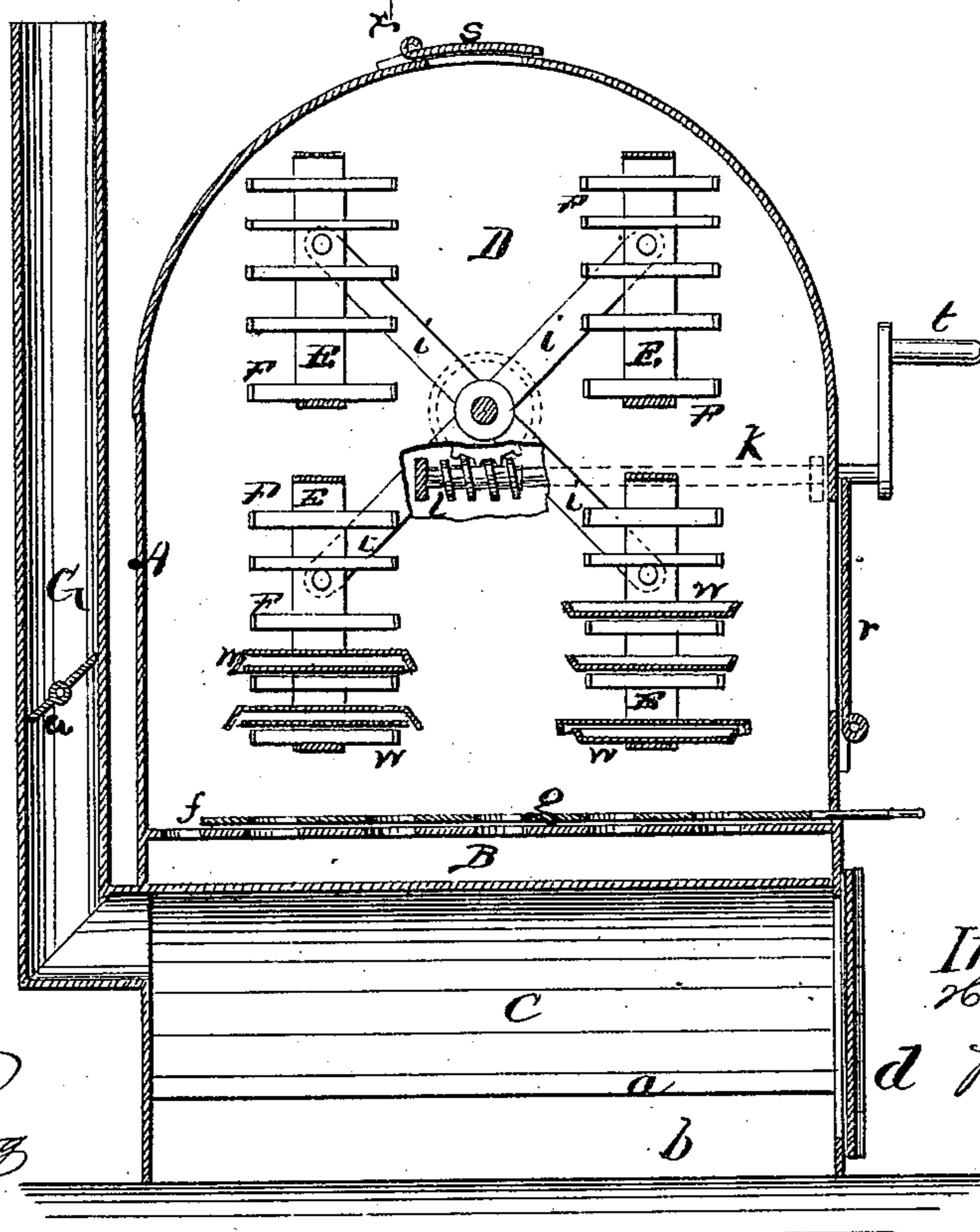


Fig: 2.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN FRUIT-DRIERS.

Specification forming part of Letters Patent No. 163,968, dated June 1, 1875; application filed January 7, 1875.

*To all whom it may concern:*

Be it known that I, HENRY E. BIDWELL, of South Haven, in the county of Van Buren and State of Michigan, have invented a new and useful Improvement in Fruit-Driers; and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

This invention is in the nature of an improvement in devices for drying fruit; and consists in a fruit-drier having a furnace, drying-chamber, and intermediate fire-chamber, in which drying-chambers are arranged revolving shelves or trays, that are kept in a vertical position, and combined with a regulator between such chamber and the fire-chamber, and with registers or valves in the lower and upper parts of the casing, whereby a circulation of heated air of any desired temperature is maintained in said drying-chamber, substantially as herein-after specified.

In the accompanying sheet of drawings, Figure 1 is a side elevation, partly in section; Fig. 2, a cross-section taken in the line *x x*, Fig. 1.

Similar letters of reference indicate like parts in both figures.

In order to successfully drive out the moisture from fruits or other substances it is desired to desiccate, it is found desirable to subject the substances to a uniform temperature of any given degree of heat, which shall thoroughly drive out the moisture from the substances, and the air thus charged with the moisture driven off must be allowed to escape, so that the substances being dried may not be surrounded with the moisture-charged air, but be surrounded with dry and hot air.

It is also desirable that the removal of the air charged with moisture may be effected as rapidly as the moisture is given off, that the articles to be dried should constantly pass from one stratum of heated air to another, which not only facilitates the drying process, for the reasons just named above, but it keeps the heated air in a state of agitation, while it also facilitates the drying process, for obvious reasons.

To accomplish these desirable results, and

also to adapt my drier to the purposes of cooking, if necessary, I construct it with a surrounding shell, A. Into the lower part of this shell is constructed a fire-chamber, B, in which is placed an arched furnace, C, provided with an ordinary grate, *a*, and ash-pit *b*, and fire-door *d*. Through the shell A, on each side of the furnace C, and opening into the fire-chambers, are registers *e e*. Immediately above the fire-chamber B is a partition, *f*. This partition is perforated, and a sliding plate, *g*, likewise perforated, is placed immediately above it. Above the partition *f* is a desiccating-chamber, D. This chamber may be domed, or of any desirable shape. Passing through the chamber D, and through suitable bearings secured to the walls of the shell A, is a shaft, *h*. This shaft is provided with arms *i*, crossing each other at right angles; and one end of the shaft *h*, which projects through the wall A, has affixed to it a gear-wheel, *j*, and secured to the outside of the wall A is a shaft, *k*, provided with a worm, *l*, which works into the gears of the wheel *j*. Each end of the arms *i* has fitted to it a stud, *m*. Fitting onto these studs *m* are metal frames E. These frames are fitted to the studs by slots, so that as the shaft *h* is revolved the frames will maintain a perpendicular position. The uprights of each of said frames are provided with a series of projections, *o*, on which rest perforated plates F. The chamber D is provided with a door, *r*, and, at its top, with a door, *s*.

My drying-machine being constructed substantially as above described, its operation is as follows: The fire having been kindled in the furnace C, the heat given off is received into the chamber B, whence it ascends, through the perforations in the plate *f*, to the desiccating-chamber D, filling that chamber with a volume of heated air of any given temperature, the temperature depending upon the material to be dried. This uniform temperature is maintained by regulating the admission of cool outer air by means of the registers *e*, and the quantity or volume of air within the desiccating-chamber D is regulated by means of the sliding plate *g*, which opens and closes, more or less, the apertures in the partition *f*. The air being in this way heated and the temperature maintained, motion is imparted to the

shaft *h* by a crank, *t*, or other suitable device, which operates the shaft *h* and the worm *l*, causing the shaft *h* to rotate by means of the gear-wheel *j*, and as the shaft rotates with the arms *i* thereon the frames *E* are carried around the interior of the desiccating-chamber. The fruit or other material to be dried is placed on the perforated plates *F*, through which the heated air passes, so that the material placed thereon is exposed to the influences of the heated air on every side. As the arms *i* revolve, the frames *E*, with the perforated plates *F* thereon, maintain, under all circumstances, a vertical position, keeping the fruit, &c., in place on the plates.

The frames *E* are provided with a series of projections, *o*, so that a number of plates, *F*, may be placed thereon, and yet not offer any obstacle to the free circulation of heated air around them and the fruit, &c.

The door *s* at the top of the chamber *D* may be opened more or less, to enable the air, after it has become charged with moisture from the fruit, &c., to pass out, and also to insure a free circulation of heated air in the chamber. The current is also maintained by the revolution of the frame *E* through the heated air as the shaft *h* revolves.

If it is desired to cook the substances placed on the plates *F*, instead of drying them, they may be placed in pans *w*, and covered over, which will preserve the moisture in the substances subjected to the heated air, and therefore cook them without drying them.

The furnace *C* is provided with a flue, *G*, with the ordinary damper *u*, which regulates the heat or burning of the furnace.

The advantages of drying substances by means of a uniform temperature, which shall be maintained, are, that it is proved by experiment that different substances dry quicker and better at different temperatures. For instance, apples are best dried at a temperature of about 180° Fahrenheit, while pears do better at 170°, peaches at 160°, and grapes at 150°.

I am aware that fruit-driers have been made with revolving trays, on which the material or substance to be dried is placed, and subjected to a regulated temperature; hence I do not claim this, broadly; but

Having now described the construction and operation of my drying and cooking device, what I claim as new, and desire to secure by Letters Patent, is—

In the herein-described fruit-drier, having the furnace *C*, drying-chamber *D*, and intermediate fire-chamber *B*, the revolving shelves or trays, in combination with the regulator *f g*, registers *e*, and door *s*, whereby there is maintained a circulation of heated air of given temperature within said drying-chamber, substantially as specified.

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Witnesses:

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