2 Sheets—Sheet 1.

# C. W. & E. A. JONES.

## FRUIT-DRIERS.

No. 183,943. Patented Oct. 31, 1876.

*Fig. 1.*

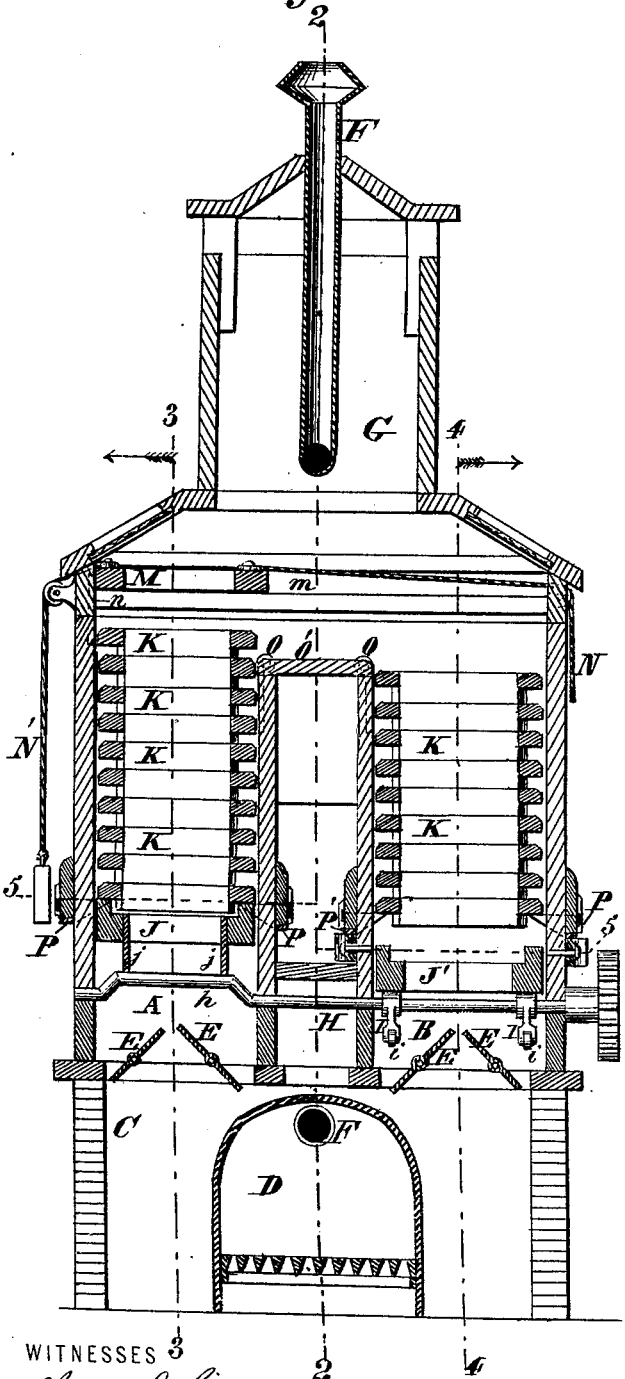
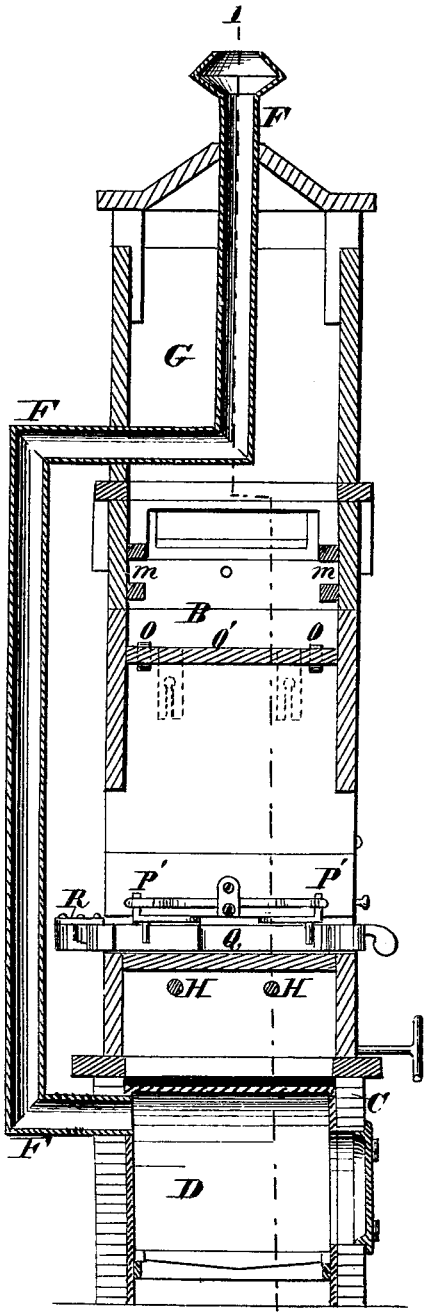



*Fig. 2.*




WITNESSES

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2 Sheets—Sheet 2.

# C. W. & E. A. JONES.

## FRUIT-DRIERS.

No. 183,943. Patented Oct. 31, 1876.

*Fig. 3.*

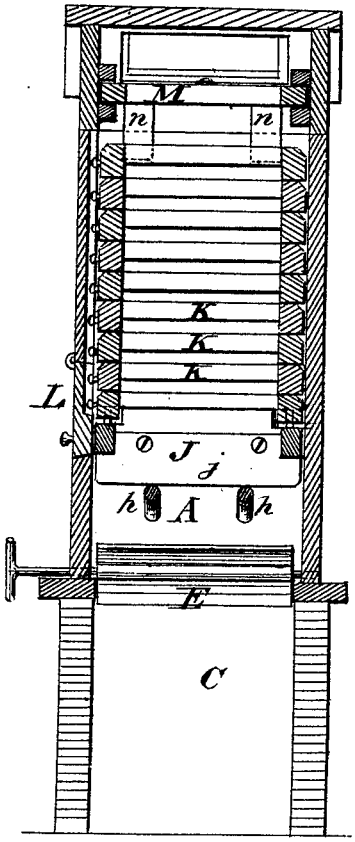



*Fig. 7.*

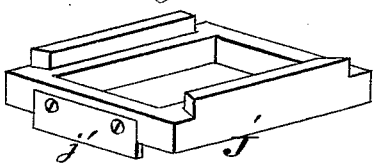



*Fig. 6.*

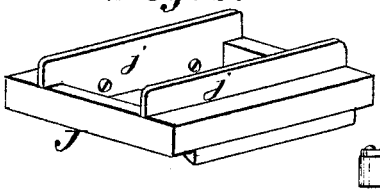



*Fig. 8.*

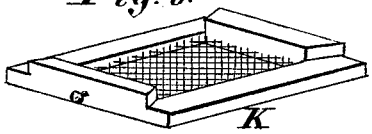



*Fig. 4.*

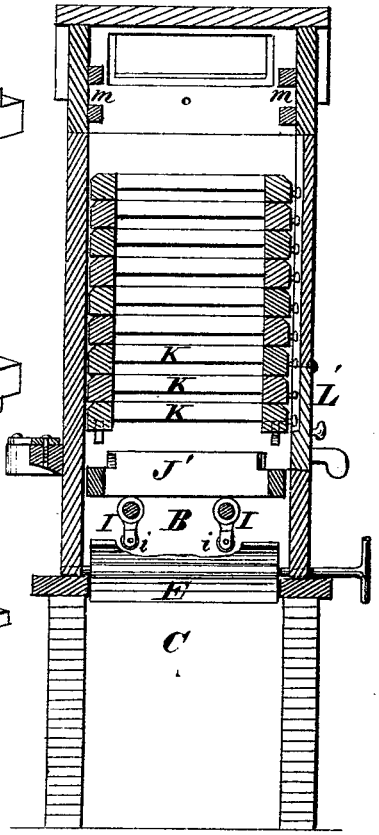



*Fig. 5.*

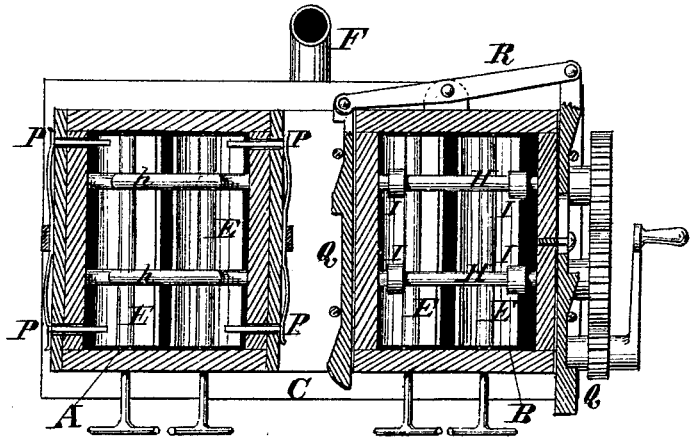
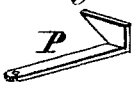



*Fig. 9.*




WITNESSES

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# UNITED STATES PATENT OFFICE.

CHARLES W. JONES, OF CENTREVILLE, AND EDGAR A. JONES, OF STURGIS, MICHIGAN.

## IMPROVEMENT IN FRUIT-DRIERS.

Specification forming part of Letters Patent No. **183,943**, dated October 31, 1876; application filed August 12, 1876.

*To all whom it may concern:*

Be it known that we, CHARLES W. JONES, of Centreville, and EDGAR A. JONES, of Sturgis, both in the county of St. Joseph and State of Michigan, have invented a certain new and useful Apparatus for Drying Fruits, Vegetables, &c.; and we hereby declare the following to be a specification thereof.

The object of our invention is the construction of an evaporator for drying fruits, vegetables, &c., by artificial heat, the whole so arranged as to take advantage of natural heated-air currents, and yet keep the drier compact and readily operated from one floor.

We find that the best way to accomplish this is to place two upright flues of any desired size upon the top of an ordinary hot-air furnace. These flues may be, say, ten feet high, more or less, and partially covered at the top, and a single flue carried as much higher as may be necessary to cause a proper draft of heated air through the drying-compartments. At the bottom of these flues are placed dampers, which may be turned on a pivot to throw any desired portion of the heated-air currents into either flue. Above these dampers is placed the machinery for moving the fruit-trays up one flue and down the other, while the heated-air currents rise through both flues, and carry off the moisture. The necessary mechanism to effect this consists of one or more shafts running horizontally through both flues near the bottom, said shaft or shafts having cams or short cranks inside the flues, to cause a rising-and-falling motion to a screen-carrier placed thereon, and provided with a hand-crank on the end of the shaft, or, preferably, a crank and pinion turning the shaft through the medium of a gear-wheel thereon, the gear-wheels meshing together where two shafts are employed. For ease in working these shafts the cranks or cams are placed opposite each other in the different flues, so as to rise in one flue while falling in the other, thus balancing the weight. At or near each corner of each flue are stationed spring screen-catches, to catch under each tray in succession, thus allowing the carrier to be lowered for another tray at the bottom of the first flue, and permitting the withdrawal of the lowermost tray in the return-flue. These spring-catches in the return-flue are made to be withdrawn simultaneously by a series of connections, so as to allow the fruit-trays to descend with each downward motion of the carrier, after the bottom tray has been withdrawn. At the top of the two flues is a carriage running in grooves arranged with a cord to draw each fruit-tray over as fast as raised, and deposit it on top of the stack of trays in the descending flue, the carriage being thrown back by a weight and cord for that purpose. Each flue is also provided with a door for the insertion and removal of the fruit-trays.

In the accompanying drawing, Figure 1 is a vertical longitudinal section of the apparatus on the line 1 1, Fig. 2. Fig. 2 is a vertical transverse section of the same on the line 2 2, Fig. 1. Fig. 3 is a vertical transverse section on the line 3 3, Fig. 1. Fig. 4 is a vertical transverse section on the line 4 4, Fig. 1. Fig. 5 is a horizontal section on the line 5 5, Fig. 1. Fig. 6 is a perspective view of the under side of one of the tray-holders. Fig. 7 is a perspective view of another tray-holder. Fig. 8 is a perspective view of the under side of one of the trays. Fig. 9 is a perspective view of one of the supporting-catches.

A B are a pair of vertical flues, supported on a common base, C, within which is a furnace, D, supplying an upward draft of heated air to both the flues. E E are dampers, by which the draft of hot air through either flue may be regulated as required. F is the smoke-flue of the furnace, the upper portion of which may be carried, as shown, through the discharge vapor-flue G, with which both of the flues A B connect at top. H H are a pair of crank or cam shafts, extending horizontally through both flues A B, near the bottom thereof, as shown in Fig. 1. These shafts may be constructed with simple cranks *h h*, as shown in the ascending flue A in Figs. 1, 3, and 5, or with cams or arms I I, carrying anti-friction rollers *i i*, as shown within the return-flue B in Figs. 1, 4, and 5. J J′ are tray-carriers, formed at top to support the trays or screens K, and adapted at bottom to the particular elevating device *h* or I, which may be used on the shafts H. Thus

the tray-carrier J, the under side of which is shown in perspective in Fig. 6, is provided with downwardly-projecting flanges *j*, to rest on the cranks *h*. The bottom of the carrier J′ may be provided with anti-friction rollers or may be plain, as shown in Figs. 1 and 7, to rest on the rollers *i* of the cams or arms I. *j′* represents a flange projecting downward on the front of the carrier J′, to prevent the carrier being moved out of the flue by the action of the cams I when the flue-doors are open. L is a door or shutter for the introduction of loaded trays within the flue A. L′ is a door or shutter for removing dried fruit or other material from the lower part of the flue B. M is a carriage running in horizontal grooves *m* in the upper part of the apparatus. Said carriage is drawn from its position over the ascending flue A to a position over the descending flue B by means of a cord, N, and restored to its former position over the ascending flue A by a weighted cord, N′. *n n* are lugs or flanges projecting downward from the side of the carriage M, to catch against the edge of the tray and draw it across from the flue A to the flue B, the movement being facilitated by rollers O O, which may be mounted in a bed, O′, adjustable in height, so as to be adapted to the thickness of the trays or the number in use at one time. Downwardly-projecting plates, by which the bed O′ is adjusted and held in the required position by means of set-screws, are illustrated in dotted lines in Figs. 1 and 2. P P represent spring-catches engaging under the lowermost tray of the tier in the ascending flue A, so as to support the stack of trays and allow the carrier J to descend and leave room for the introduction of another tray. P′ P′ are similar catches in the lower part of the return-flue B, for supporting the stack of trays while the lowermost one is withdrawn at bottom. The spring-catches P′ P′ in the return-flue B are retracted simultaneously by means of wedge-shaped slides 2, connected by a lever, R, so as to permit the stack of trays to descend at each downward movement of the carrier J′.

In operating the drier, a fire is placed in the furnace beneath; the dampers are turned to throw the heated-air currents through the flue A, where the fruit is first introduced; the tray-carrier is depressed by rotating the shaft or shafts; the small door L is opened and a fruit-tray inserted upon the carrier inside the flue A. The shaft or shafts being rotated half a revolution raises this tray above the spring-catches P, at the same time depressing the carrier in the other flue, B, so that an empty tray can be placed thereon. Another half-revolution of the shaft raises this tray and lowers the other carrier, ready for another tray loaded with fruit. This operation is continued until both flues are filled with trays, one series containing the fruit in different stages of dryness.

The mode of operation is now changed by drawing a tray of fruit over on top of the series of frames in the return-flue B, and withdrawing a tray from the bottom as fast as one is inserted in the other flue. As the trays containing fruit move downward, that flue is supplied with a sufficient amount of heated air to finish the drying process by the time they reach the bottom of the flue, where they are withdrawn from the evaporator.

The spring-catches P′ in the return-flue are thrown out of the way, so as to allow the stack of trays to rest on the carrier, and when low enough the catches are thrown in again just above the lower screen, thus allowing that one to be withdrawn without any pressure on it from above.

The following is claimed as new:

1. The crank or cam shaft, in combination with the slides Q, lever R, and spring-catches, as and for the purpose set forth.

2. The slides Q and lever R, for withdrawing the spring-catches or supports, to permit the trays to pass down, as set forth.

3. The carriage M at the top, having downwardly-projecting flanges *n*, for shifting the trays from one flue to the other, as set forth.

4. The adjustable roller-bed O O′, as and for the purpose set forth.

5. The combination, with a flue, A, base C, and furnace D, of a pair of winged dampers, E E, adapted to direct the heated currents to any part of the under surface of the trays, as set forth.

The above specification of our improved evaporating apparatus signed this 26th day of July, 1876.

CHARLES W. JONES.
EDGAR A. JONES.

Witnesses:
ROBERT H. MORRISON,
MONROE EVANS.