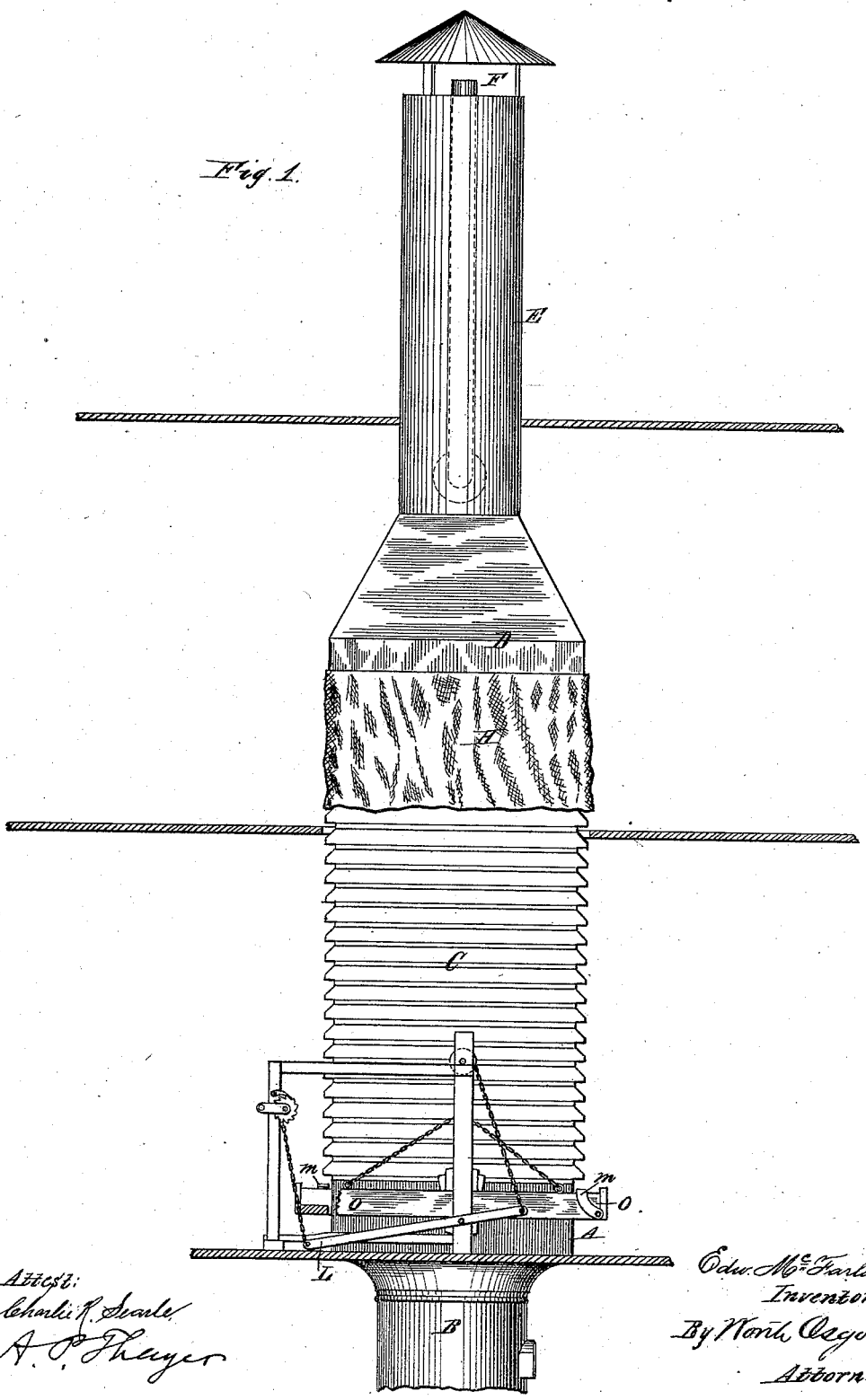
3 Sheets—Sheet 1.

E. McFARLAND.
Fruit-Drier.

No. 219,362. Patented Sept. 9, 1879.

Fig. 1.



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3 Sheets—Sheet 2.

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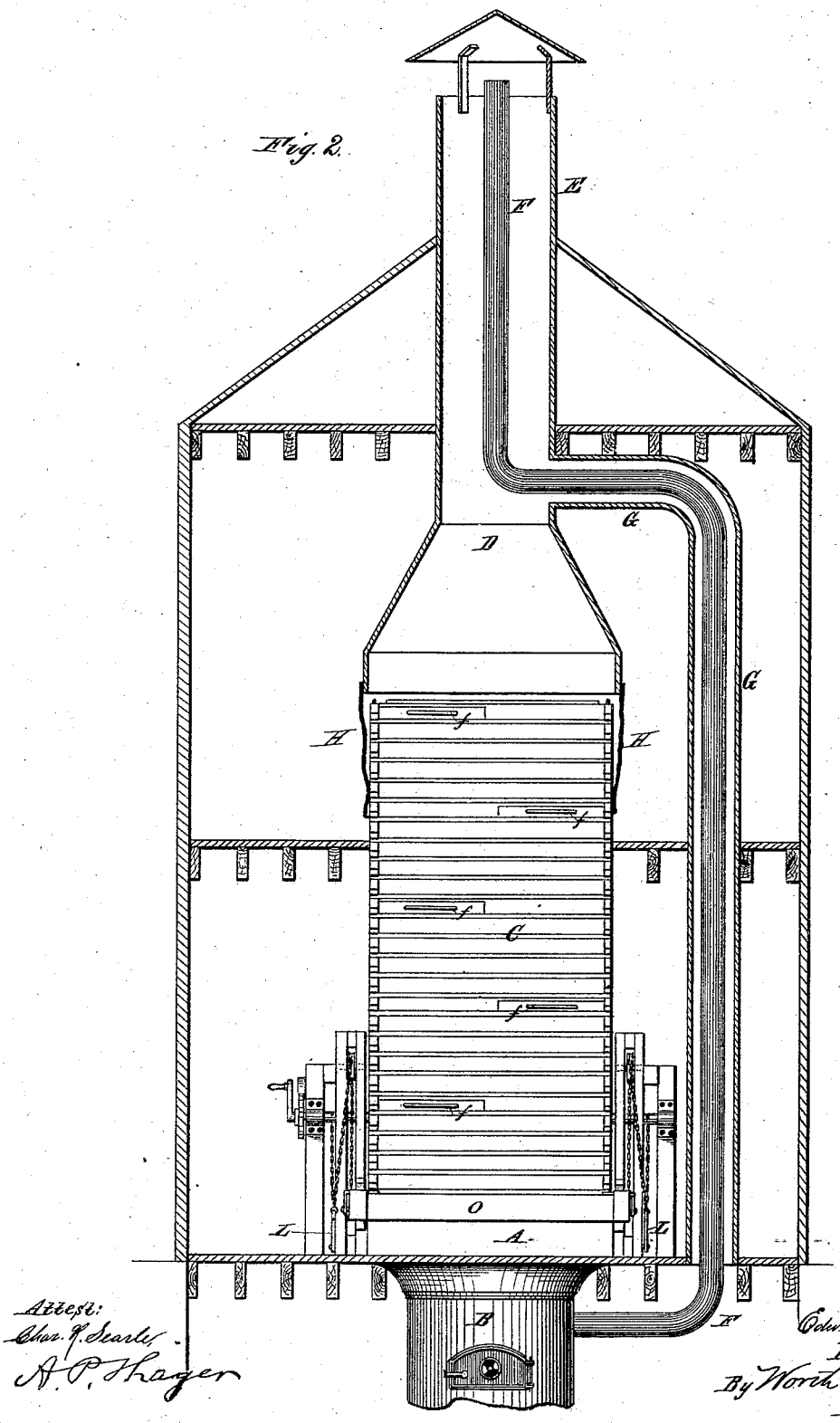
Fig. 2.



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3 Sheets—Sheet 3.

E. McFARLAND.

Fruit-Drier.

No. 219,362. Patented Sept. 9, 1879.

Fig. 3.

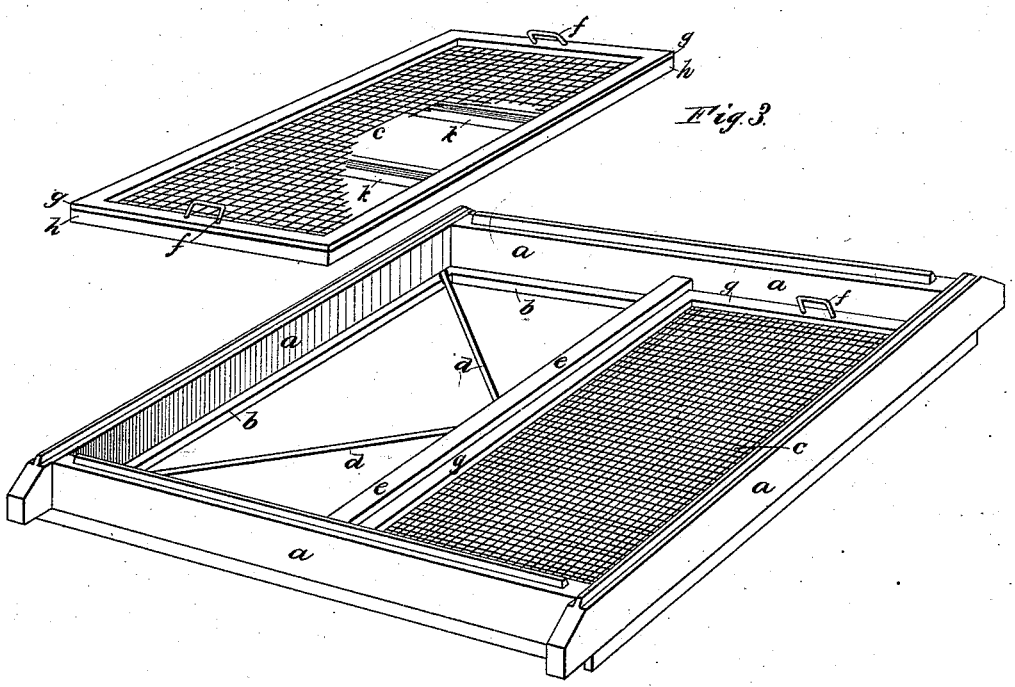
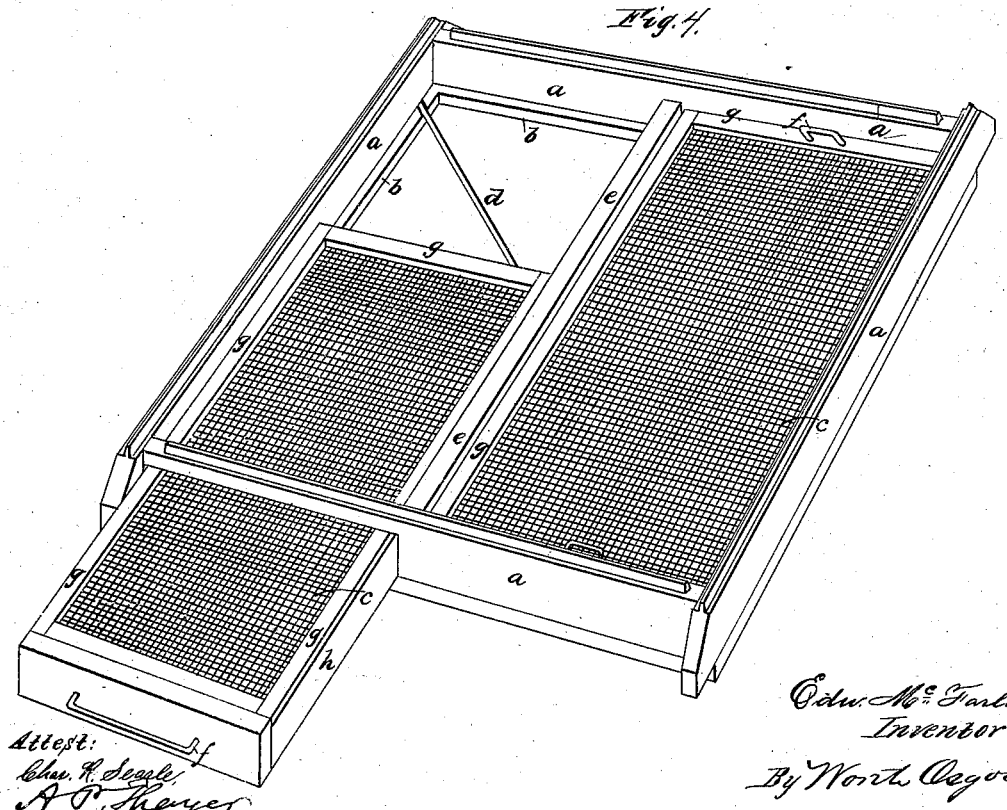


Fig. 4.



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UNITED STATES PATENT OFFICE.

EDWARD McFARLAND, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN FRUIT-DRIERS.

Specification forming part of Letters Patent No. **219,362**, dated September 9, 1879; application filed June 23, 1879.

To all whom it may concern:

Be it known that I, EDWARD McFARLAND, of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in 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 side elevation and partial section of a drier constructed and arranged in accordance with my invention; and Fig. 2 is a front view, partly in section, of the apparatus illustrated in Fig. 1. Fig. 3 is a perspective view of one of the trays which form a part of the drier proper, the same being detached from the stack, and one section of its bottom being elevated from its seat, the better to show its general construction and arrangement; and Fig. 4 is a like view, indicating the peculiar construction of an intermediate tray, in which a portion is made capable of being withdrawn for purposes of inspecting the fruit thereon without disturbing the remaining trays in the stack.

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

My invention has relation to that class of machines intended for the drying of fruit, vegetables, &c., by the application of artificial heat; and it consists, essentially, in an improved means of forcing or inducing a rapid flow of the heated air through the material upon the trays; in a novel and useful construction of the main trays, so that they may be more easily handled when loaded than heretofore; in the provision of a sliding bottom, by use of which the material being operated upon may be conveniently inspected without disturbing any of the remaining trays; and in certain peculiarities of construction and relative arrangements or combinations of parts, all of which will be hereinafter first fully described, and then pointed out in the claims.

To illustrate the several features of my invention, I have chosen a drier wherein the outer walls are made up of trays fitting one upon another, the stack being built up tray by tray from the bottom, the built portion being elevated sufficiently for the purpose of inserting a new tray below it by a mechanical contrivance which couples with or bears against the lowermost tray, such as illustrated in the patent to A. J. Reynolds, No. 190,368, of May 1, 1877.

A is the base of the machine, supposed to rest upon a platform immediately surrounding it, and affording a standing-place for the operators; and B is a portion of a hot-air furnace below the platform, or in other convenient locality, which furnishes the required amount of heated air. The air from this heater passes up through the stack of trays C, the rims or walls of which, when properly matched and located one upon the other, make up the outer walls of the drier, and at the same time the flue through which the heated air is compelled to pass, and in which the fruit, &c., is located.

In the drying of fruit and vegetables it is found that as the air becomes charged with the moisture therefrom its upward movement becomes more and more sluggish, requiring an increased consumption of fuel in order to produce a degree of heat sufficient to force it through the material; and in passing through the material on the trays this highly-heated air shrivels and contracts the fruit, &c., in some lines more than in others, necessitating a careful watching of the contents of the drier, so as to avoid uneven results—a feature to which my improved construction of trays has special reference.

To obviate this excessive consumption of fuel, and, in consequence, to render the drying more uniform and perfect, it becomes necessary to provide some means of increasing the draft through the drying-flue; and to do this cheaply, effectively, and conveniently, I construct my apparatus as follows: Over the stack of trays or over the flue I locate a hood, D, the lower mouth of which may be made of the proper size to envelop the upper extremity of the stack, and connect the upper mouth with the chimney E. This chimney is supported above the position of the stack of trays, which stack, as it is gradually increased in height, approaches the mouth of the chimney. This arrangement leaves a clear space beneath the chimney for manipulation of the trays, and the chimney is not supported upon any casing for the trays, such as immediately surrounds

them in previous forms of driers and prevents immediate access to them.

The timbers above the platform on which the workmen stand form the special points of support for the chimney, which may be made to depend therefrom by the application of suitable mechanical attachments, which will readily suggest themselves to the builder.

From the heater B the smoke-pipe F is carried up into the chimney E just above the hood D, and out at the top of the chimney, or, at least, up into the region of the top. To secure the best advantages, this smoke-pipe should be about centrally located within the chimney, and it should be so arranged as not to interfere with the convenient workings of the drier.

From this arrangement it will appear that the heat in the smoke-pipe, which would otherwise be wasted, will be imparted to the moisture-charged air above the drier, and this, in turn, will have a greater tendency to rise and pass off through the chimney, inducing a more rapid flow of air through the drying-flue, in accordance with well known principles of pneumatics. The desired increased air-draft is thus economically produced, and the more thorough and uniform drying accomplished. By increasing the draft in this manner—that is, after the air leaves the contents of the trays—the condensation of moisture upon the top tray is obviated.

Around that part of pipe F between the first floor and its connection with the chimney I propose to place a jacket, G, the purpose of which is to confine the heat which would otherwise be radiated therefrom, and to conduct this to the chimney also, thereby aiding the draft within the air-flue, and at the same time excluding the heat from the work-rooms, which are upon the first and second floors.

Around the hood is a canvas or other flexible curtain, H, hanging down sufficiently far to envelop some of the upper trays and to exclude air, which would otherwise enter the hood from the outside of the stack.

To remove a tray from the top, the curtain may be easily drawn out of the way, and will immediately resume its place after the tray is detached from the stack. Since the hood remains stationary, the curtain forms a convenient prolongation thereof, useful at such times as before the stack reaches its ultimate height; and inasmuch as the curtain will immediately resume its proper place after having been disarranged, but little fresh air can enter to cool and check the draft through the stack.

The apparatus herein specially alluded to is generally of large size, and its economical use requires about twenty or twenty-five trays for drying peaches and thirty or more for apples, &c., though, of course, it may be made up of any desired number of trays.

The canvas curtain enables one to employ the same machine with varying numbers of trays. The trays are also of any desired size; but in the larger machines their exposed surfaces are of such extent as to render them inconvenient and difficult to handle, especially when loaded with fruit. For this reason I make the bottoms in two sections, as indicated in Fig. 3, and so arrange them that they may be removed from the main frame of the tray, if desired.

The exterior rim, *a a a a*, of the tray is provided with an interiorly-projecting ledge, *b b*, upon which the removable bottoms *c c* find a support when in place; and to prevent disarrangement of the rim the diagonal tie-rods *d d* are secured, as shown, beneath the proper position of the bottom sections. A central division-strip, *e*, separates the tray into two nearly equal parts, and this strip is also provided with a projecting ledge similar to *b b*.

The foraminated bottom *c* is mounted in a light frame-work, composed of an upper and an under strip, *g h*, of such size as to fit the compartment between walls *a a* and division-strip *e*, and upon this frame are mounted the handles *f f*, by which the sectional bottom may be removed. If desired, also, the sectional bottoms may be provided with stiffening-pieces *k k*, the purposes of which are apparent.

The walls of each of the trays in the system are, of course, suitably matched, so as to make a close joint with the one above and the one below.

After a tray has been removed from the top of the stack its contents may be easily handled by lifting out the sectional bottom, one section at a time; and the tray may be similarly charged with green fruit, its bottom being loaded section by section.

In extraordinarily large driers it may be found desirable to divide up the bottoms of the trays into three, or even more, sections, it being contemplated that any desired number shall be used.

To provide an easy means of inspecting the condition of the fruit at different points of the drier, I arrange some of the trays with sectional bottoms, so that one of the sections may be drawn out through a slot in the wall *a*, as indicated in Fig. 4, wherein the handle *f* is placed upon the end of the frame-work. It is obvious that under this construction the contents of this sliding section may be viewed without disturbing any other tray in the system—a decided advantage over any such arrangement as requires that the walls of the flue be broken in order to inspect the interior, since this breaking admits fresh air, which checks the drying process, besides being inconvenient, and requiring considerable power to elevate the trays above the break.

The one slot in the front wall, *a*, for the passage of the sectional bottom will not injuriously weaken the tray, and only one will generally be required, since the condition of one side of the tray is a good indication of that of the other side; but any number might be so made.

It is not intended nor deemed at all necessary to make all the trays with sliding sectional bottoms. About every fifth tray in the sys-

tem should be one capable of permitting inspection of its contents, and if these be arranged, as indicated, so that the sliding sections shall be on alternate sides of the drier, the purposes of this feature of the invention will be very well accomplished. A greater or less number of these trays may be introduced into the stack, and their use will enable the operator to judge of the most advantageous regulation and disposition of the fruit in accordance with the heat and other conditions necessary to be observed.

The stack is elevated sufficiently for the introduction of a fresh tray by means of the lever L and its connections, the catches *m m* automatically assuming their proper places beneath the projecting corners of the tray as soon as the carrier O O is lowered ready for the next adjustment.

Heretofore in this class of driers—that is, in such wherein the outer walls of the dry-house are made up of a series of interlocking tray-walls—no provision has been made for a prolongation of the drying-flue without the necessity of adding more trays, though I am fully aware that a chimney has before been placed upon the ordinary stationary walls of a drier and the trays located within these stationary walls. The omission of the outer stationary walls in this class of driers is a considerable improvement both in economy of construction and facility of handling the fruit. By the addition of the chimney, I am enabled to use this class of machines with few or many trays, and thus to adapt it for drying materials of varying qualities requiring varying numbers of layers within the drying-flue.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the walls of a series of fruit-drier trays matched together and forming the outer walls of the drier, a chimney suspended above the position of the stack of trays, free from the walls of the drier formed thereby, and provided with a hood at its lower mouth to receive and fit upon the walls of the uppermost of the series of trays, substantially as shown and described.

2. In combination with the walls of a series of fruit-drier trays matched together and forming the outer walls of the drier, a chimney suspended above the position of the stack of trays, free from the walls of the drier formed thereby, and forming an extension of the flue through the drier, substantially as shown and described.

3. In combination with the walls of a series of fruit-drier trays matched together and forming the outer walls of the drier, a chimney suspended above the position of the stack of trays, free from the walls of the drier formed thereby, and forming an extension of the flue through the drier, and the smoke-pipe extending up through the chimney-extension, substantially as and for the purposes set forth.

4. In combination with the drying-flue formed by the walls of a series of matching trays, a chimney extending thereabove, and provided with a hood at its lower mouth and a depending flexible curtain, the whole being arranged to operate substantially as shown and described.

5. In an apparatus for drying fruit, &c., the combination of the hot-air furnace, the drying-flue located thereabove, the air-draft chimney, the smoke-pipe entering said chimney above the lower mouth thereof, and the casing for the smoke-pipe, substantially as shown and described.

6. In a fruit-drier in which the outer walls of the structure are made up of the interlocking tray-walls, the combination, with the walls of a fruit-drying tray, slotted as explained, of the foraminated bottom plate, made removable through the slot in the front tray-wall, substantially as and for the purposes set forth.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of two witnesses.

EDWARD McFARLAND.

Witnesses:
WORTH OSGOOD,
S. W. HOLCOMB.