

E. Sperry's 2 Sheets Sheet 1

Solar Cooking Apparatus

117476

PATENTED JUL 25 1871

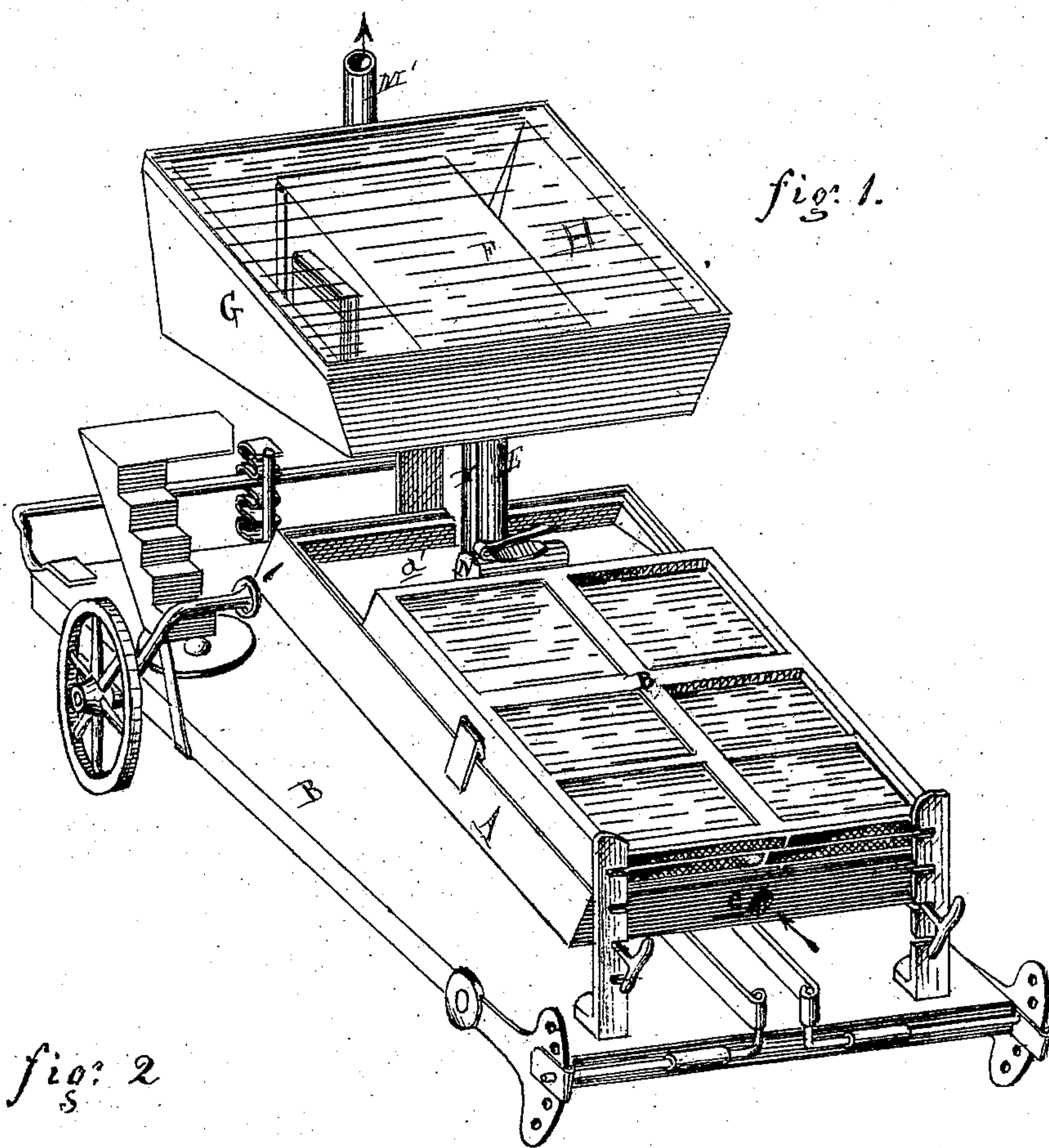
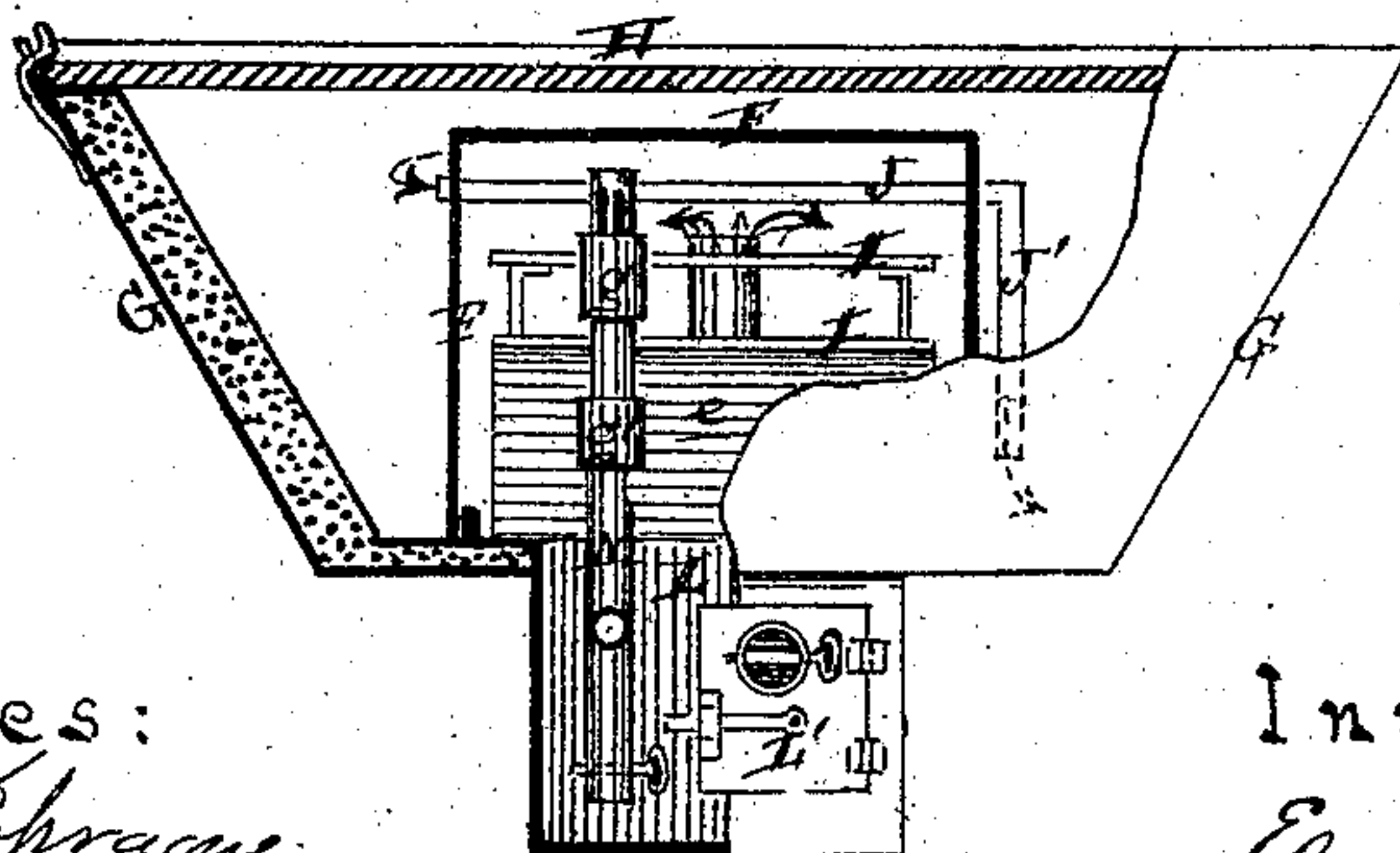


fig. 1.

fig. 2



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per Atty
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E. Sperry's

2 Sheets Sheet 2

Solar Cooking Apparatus

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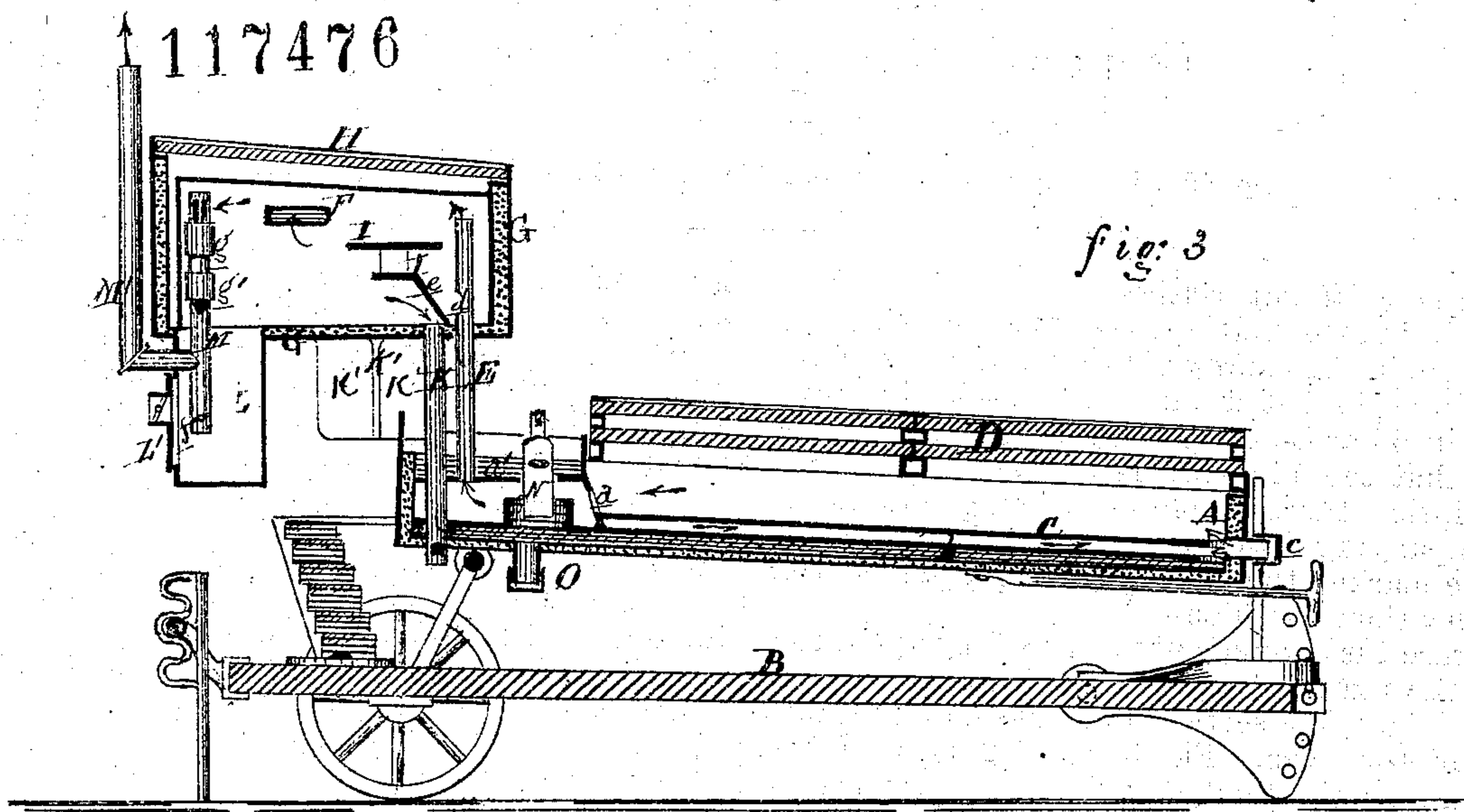
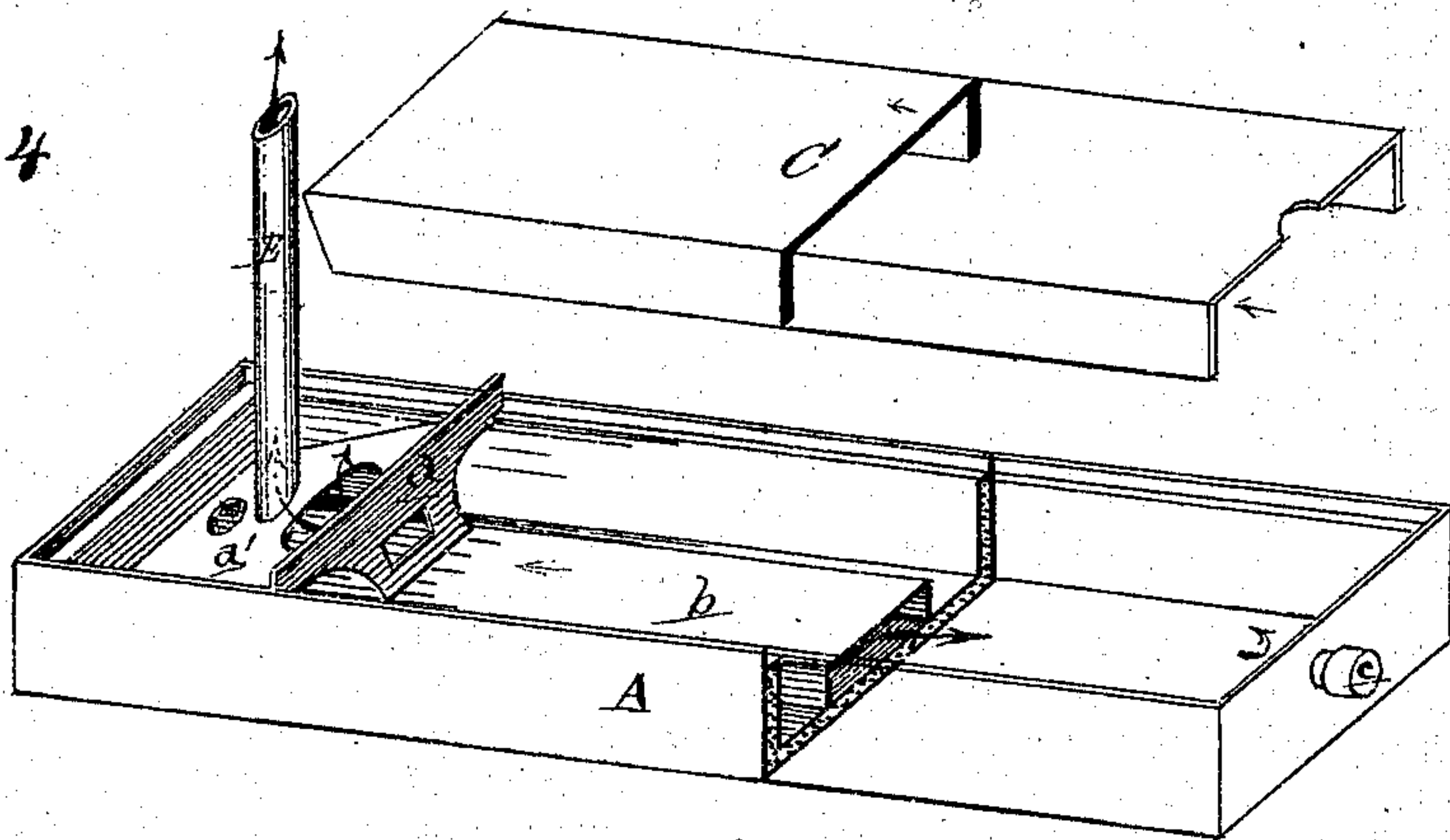


fig. 3

fig. 5



fig. 4



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UNITED STATES PATENT OFFICE.

EBENEZER SPERRY, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN COOKING APPARATUS.

Specification forming part of Letters Patent No. 117,476, dated July 25, 1871.

To all whom it may concern:

Be it known that I, EBENEZER SPERRY, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Solar Cooking Apparatus; and I do declare that the following is a true and accurate description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon, and being a part of this specification, in which—

Figure 1 is a perspective view of my apparatus from the rear end, or that inclined toward the sun. Fig. 2 is a sectional elevation of the front part of the oven. Fig. 3, sheet 2, is a central vertical longitudinal section of the apparatus. Fig. 4 (double figure) is a perspective view, partially in section, of the heat-concentrating chamber, and its channel-plate, detached. Fig. 5 is a cross-section of the double-glazed sash of the heat-concentrator.

Similar letters of reference indicate corresponding parts in each figure.

The nature of this invention relates to the construction of an apparatus for concentrating the sun's radiant heat and utilizing the same for culinary purposes, and in such a manner that the same may be used in connection with or independent of artificial heat. The invention consists in the novel and peculiar construction of a heat-concentrator or air-heating chamber, which communicates with an oven into which it discharges heated air, said oven being provided with additional means of like character for concentrating and utilizing the sun's radiant heat to prevent the condensation of the heated current delivered therein by contact with the articles being subjected to its action; also, in the construction and general arrangement of the various parts for governing the action and movement of the heated currents, and of certain devices whereby artificial heat may be used to accelerate, supplement, or replace the natural heat in the cooking process, the whole being mounted on a suitable vehicle or truck to facilitate its movement or transportation as such becomes necessary.

In the drawing, A represents an oblong metallic double-walled box or chamber, the sides, bottom, and ends of which are provided with a non-conducting filling between the outer and inner walls; it is pivoted at one end to a standard rising from the body of the truck B, on which it is

mounted, and at the other end it is provided with suitable mechanism for raising or lowering it so that the sun's rays shall fall directly upon its upper surface. Across the upper end of the chamber is a bulk-head, *a*, and cover, *a'*, forming a chamber at that end. On the bottom of the box A is a duct or flue, *b*, communicating with the bulk-head chamber, and at the lower end is provided with an opening communicating with the main chamber, in the lower end of which is an inlet-cock, *c*, for the admission of fresh air. The bulk-head has several openings, one at either side of and the other just over the flue. C is a diaphragm or channel-plate of black sheet-iron, placed in the box A, dividing it into upper and lower chamber, both of which communicate with the upper or bulk-head chamber. At the lower end of the plate C is an opening, as shown in Figs. 3 and 4. D is a double-glazed sash, tightly fitted to the top of the box A not occupied by the bulk-head chamber, from which rises the hot-air pipe E into the oven F.

Now, if the sash be presented perpendicularly to the sun's rays the radiant heat of the latter will be transmitted to the interior of the box A, where the diaphragm C is in position not only to be heated by the transmitted heat, but, in addition, attracts and concentrates an additional amount of caloric, which flows up into the bulk-head chamber and thence up the pipe E into the oven F, which is inclosed in a double-walled chamber, G, the top of which is provided with a glazed sash, H. The oven is provided with transverse shelves I and J, the latter being tubular, extending through the side walls of the oven and depending at one side nearly to the bottom thereof, as shown at J' in Figs. 1 and 2. On these shelves articles to be cooked or fruit to be dried are placed and the process carried on by the heated current sent in the heat-concentrator through the pipe E. The hot current is prevented from condensing and to a certain extent reheated by the rays of the sun transmitted to the interior through the glass top of the oven-chamber, fresh air being admitted to the lower end of the concentrator through the inlet-cock *c* in sufficient volume to keep up a circulation. The pipe E, besides discharging its current at the upper part of the oven, is provided with an opening, *d*, to discharge it at the lower part of the oven if necessary, the pipe being provided with suitable means

for regulating its delivery. The shelves I are supported by an inclined transverse diaphragm, *e*, behind which the pipe E enters the oven. K is a condensing and return-flue, leading from the bottom of the oven, in front of the diaphragm *e*, down into and through the bottom of the bulk-head chamber of the air-heater. The lower projecting end is provided with suitable means of drawing off the condensed moisture, while it is provided with an opening leading into the channel *b* for the cold vapors to pass down and be reheated. The pipe K below the chamber G is provided with a series of hollow radiators, K', opening into it, by means of which the vapors withdrawn from the oven are rapidly cooled by radiation, and, their specific gravity being rapidly lowered thereby, they sink into the lower channel *b* referred to, and thus keep up a constant circulation. L is a pit, pendent from the lower part of the oven, and is provided in front with a door, L', through which access is had to the interior of the oven. This door is provided with a collar, by means of which a pipe may be connected therewith leading from an artificially-heated oven, to discharge therein an additional volume of heated air, if such becomes necessary, as in cloudy weather, or to accelerate the cooking process. M is an exhaust-pipe closed at the top, extending from near the top of the oven down into the pit, being provided with a valve, *f*, at the lower end; above this valve the exit-flue M' connects with the exhaust-pipe in the manner shown in Fig. 3. Near the top of the pipe M is an opening, closed by a sleeve, *g*, and near the bottom of the oven another, in like manner closed by a similar sleeve, *g'*. If both of these openings be closed and the valve in the bottom of the pipe be opened, the oven may be used as a drying-chamber for drying fruit, vegetables, &c.; close the valve and the lower sleeve, and the entire heat will be concentrated in the top of the oven; open the lower sleeve, and the heat will be diffused throughout the oven, a higher temperature being, of course, maintained at the top. N is a vessel or boiler for boiling water, set into the bulk-head chamber at a point where the heated currents will strike it in their passage toward the pipe E. This vessel should be provided with a proper safety-valve. O is a short pipe or collar about an opening in the passage *b* of the heat-concentrating chamber, at which an artificial heat-connection may be made if desired.

When the contents of the boiler N are lower in temperature than the heated air-currents coming in contact with them, said currents will in a measure be condensed, and, by reason of their increased specific gravity, will sink to the lowest apartment and descend along the inclined plane to its foot, where, rising into the heating chamber, they pass up back in contact with either side of the black sheet-iron plate C; they are raised in temperature by it until they arrive at the partial vacuum induced by contact with the boiler. When the contents of the boiler shall have reached such a

temperature as not to induce further condensation of the heated air they will rise through the pipe E into the oven, where, coming into contact with the bodies or substances therein, they will be in a measure condensed and fall through the condensing-pipe K to the lower chamber again. Any moisture arising from condensation will settle in the bottom of said pipe, whence it may be drawn off, while the air passes along into the return-chamber, and as at this point rarefaction commences any condensation of moisture on the surface of the glass-covering is prevented.

When, however, the contents of the oven have been so heated that the atmosphere or other medium of communication will rise instead of falling, they may be let out through either of the openings in the exhaust-pipe, as occasion may require, and any condensation by this outlet will be deposited in the pit. There must be no communication between the oven and the upper heating-chamber, so that any moist vapor can come in contact with the glass covering to render it opaque and hinder the free passage of the sun's rays.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The non-conducting chamber A, provided with a glass covering, D, and the dark sheet-metal plate C for absorbing and concentrating the sun's radiant heat and utilizing the same for culinary and other purposes, substantially as described.

2. The construction and arrangement, with relation to the heat-concentrating chamber A, of the re-heating chamber G, provided with a glass covering, H, and containing an oven, F, said oven being connected with the chamber A by the hot-air pipe E, and to the channel *b* in the bottom thereof by the condense-pipe K, as and for the purpose set forth.

3. The arrangement, within the oven F, of shelves I J, diaphragm *e*, exhaust-pipe M, provided with sleeves *g g'* and valve *f* at its several openings, and the exit-flue M', as and for the purpose set forth.

4. The boiler N, arranged in the upward flue of chamber A, as and for the purposes herein specified.

5. The door L', in a stove-oven, when provided with a collar, as herein described, for the purpose of connecting a pipe so as to convert any ordinary stove-oven into an air-furnace.

6. In combination with the air-heating chamber G, the inclined reflecting sides herein described, for the purpose of concentrating a greater amount of heat on the oven F.

7. The corrugated sash, when constructed as herein described, for the reception of a greater or lesser number of thicknesses of glass, for the purposes set forth.

EBENEZER SPERRY.

Witnesses:

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