

J. C. McKEE.  
Evaporating Pan.

No. 36,849.

Patented Nov. 4, 1862.

Fig. 1,

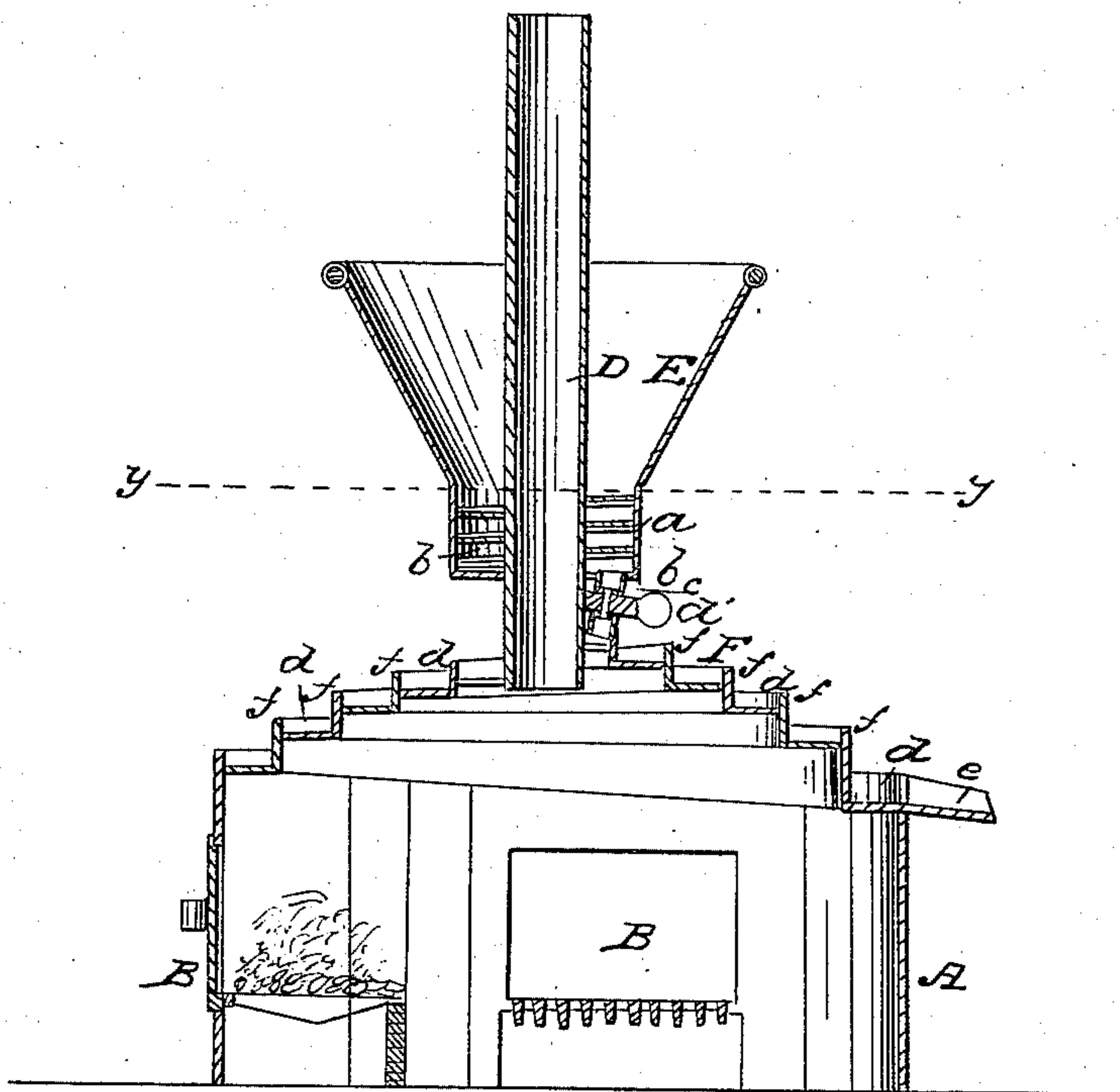
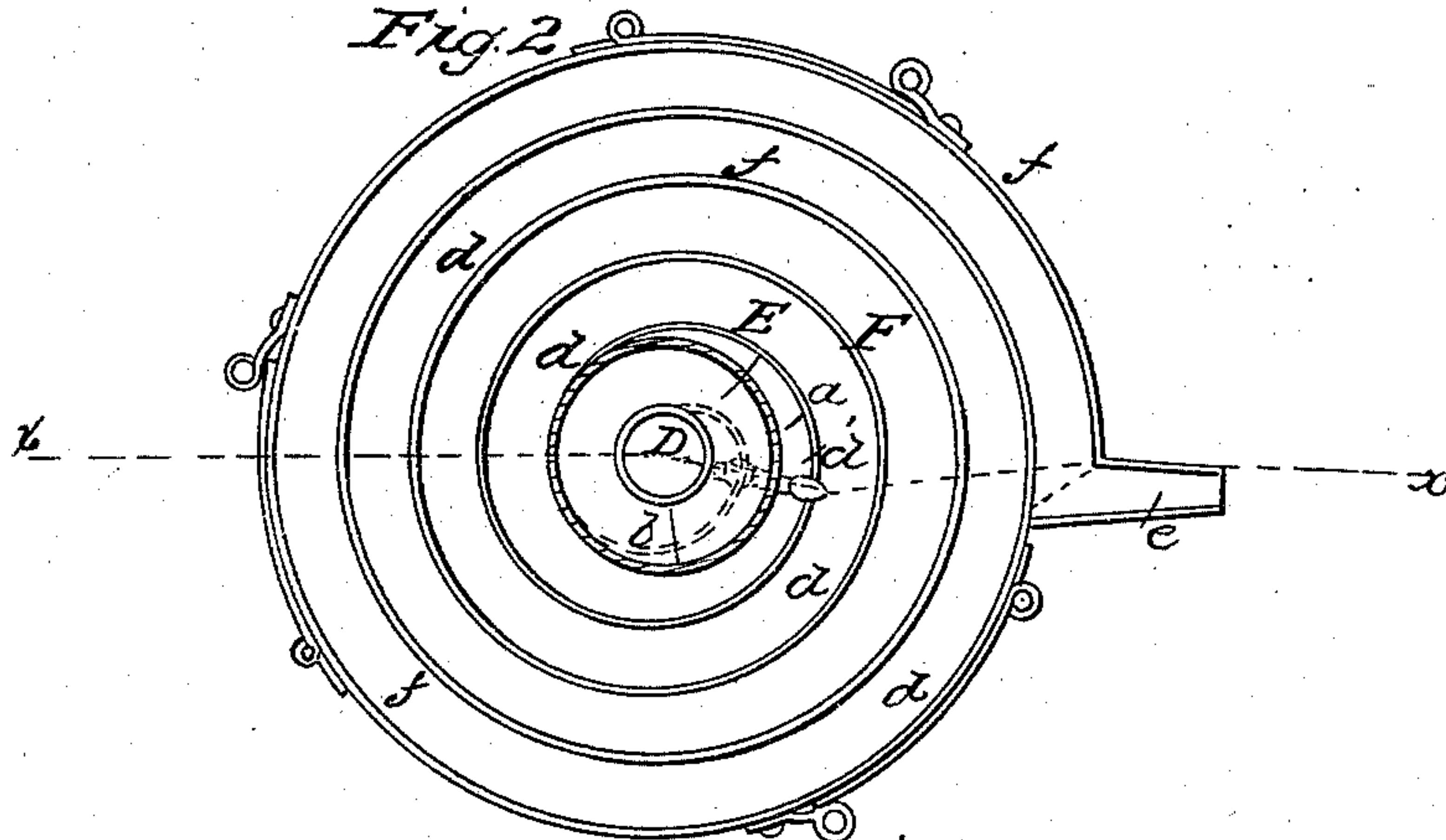


Fig. 2,



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# UNITED STATES PATENT OFFICE.

JAMES C. McKEE, OF URBANA, ILLINOIS.

## IMPROVED EVAPORATOR FOR SACCHARINE LIQUIDS.

Specification forming part of Letters Patent No. 36,849, dated November 4, 1862.

*To all whom it may concern:*

Be it known that I, JAMES C. McKEE, of Urbana, in the county of Champaign and State of Illinois, have invented a new and Improved Evaporator for Saccharine Liquids, &c.; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a vertical section of my invention, the line *x x*, Fig. 2, indicating the plane of section. Fig. 2 is a horizontal section of the same, taken in the plane indicated by the line *y y*, Fig. 1.

Similar letters of reference in both views indicate corresponding parts.

This invention consists in the arrangement of a helical inclined channel receiving the liquid to be evaporated in its middle or highest part, and discharging it at the circumference or at its lowest part, in such a manner that the liquid in passing from the highest to the lowest point of the helical channel is spread in a thin sheet over a large heated surface, and the evaporation is accomplished in a short time with little labor and with a comparatively small expenditure of fuel. It consists, finally, in the arrangement of a heater provided with a regulating-faucet, in combination with the helical evaporator, in such a manner that the discharge of the liquid from the heater can be regulated according to the temperature of the helical channel, and according to the desired degree of evaporation.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation, with reference to the drawings.

The furnace A, which supports my evaporator, is built up of brick; or it may be made of any other suitable material. It is provided with three (more or less) fire-doors, B, each of which leads to one grate, so that the heat is as near as possible equal all round. The products of combustion are carried off through a smoke-pipe, D, which rises from the center of the furnace A, and which passes through the heater E, as clearly shown in Fig. 1 of the drawings. The smoke-pipe is made of sheet metal or other good conductor of heat, so that the hot gases and other products

of combustion in passing through said smoke-pipe are capable of raising the temperature of the liquid contained in the heater to a pretty high point.

The heater is made in the shape of an inverted conic frustum secured to a short cylinder, *a*, the interior of which forms a spiral passage, *b*, so that each particle of juice or other liquid has to pass several times around the smoke-pipe before it reaches the discharge-pipe *c*. This pipe is closed by a faucet, *d'*, and it leads to the evaporator F, which consists of a helical channel, *d*, running down from the center toward the circumference, where it connects with the spout *e*.

This evaporator is made of cast metal or other suitable material, and it fits on the furnace, so that the heat from the fire in the furnace strikes the same and raises it to the desired temperature. The helical flange *f*, which forms a portion of the passage or channel *d*, rises sufficiently high to prevent the scum or foam running over it on any part of the evaporator, and the inclination of said channel is so arranged that the liquid runs down over it in a thin stratum.

When this evaporator is used for saccharine liquids, for which it is particularly calculated, the raw juice is introduced in the heater E, which is kept near full, by a faucet pump or pipe, from a vat in which the juice is contained as it runs from the mill. By heating the juice in the heater the heaviest parts of the scum rise to the surface, and can be taken off at leisure, and the faucet *d'* is opened and the juice is made to run slowly down in the helical channel or evaporator F. While passing through this channel the scum rises to the surface, and can be raked off with the greatest convenience, and by the time the stream of juice arrives at the spout *e* the evaporation is completed and the finished sirup is collected in a suitable receptacle. There is a constant stream of juice running down from the heater and a constant stream of sirup running out of the spout.

It is obvious that the thickness to which the sirup is boiled down depends upon the greater or less quantity of juice running down from the heater in a given time and upon the temperature of the evaporator. The inclination of the helical channel and its length are so ar-

ranged that the juice is about six minutes on the evaporator before it is boiled down, and runs off as sirup.

My evaporator makes very clear and well-flavored sirup; it takes a comparatively small quantity of fuel; it is easily managed, and there is no danger of scorching the sirup.

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

1. The evaporator F, constructed with a helical inclined channel, in combination with the

furnace A, constructed and operating substantially in the manner and for the purpose herein set forth.

2. The arrangement and combination of the heater E, smoke-pipe D, regulating-faucet *d'*, helical inclined channel *d*, and furnace A, all constructed and operating substantially as and for the purpose described.

JAMES C. McKEE.

Witnesses:

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