W. CLOUGH, dec'd.

W. V. CLOUGH, Administrator.

SUGAR BOILING AND EVAPORATING PAN.

No. 189,082. Patented April 3, 1877.

Fig. 1

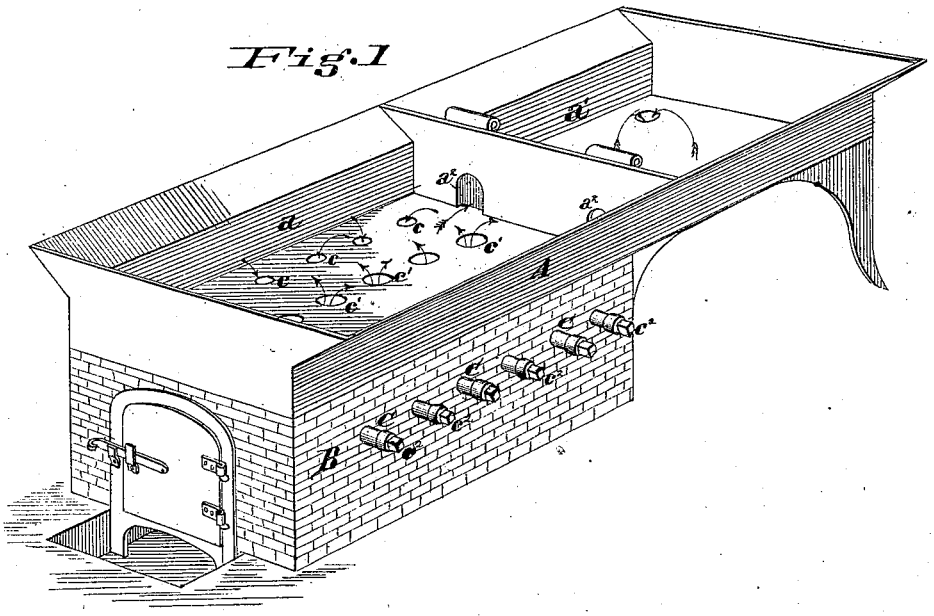
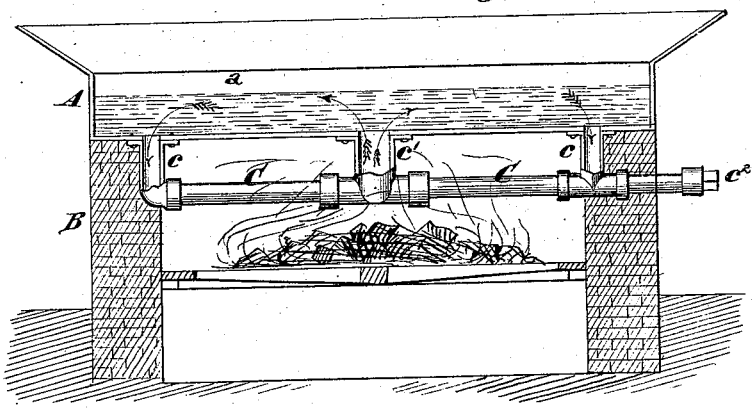


Fig. 2



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UNITED STATES PATENT OFFICE.

WILLIAM V. CLOUGH, OF MADISON, INDIANA, ADMINISTRATOR OF WILLIAM CLOUGH, DECEASED.

IMPROVEMENT IN SUGAR BOILING AND EVAPORATING PANS.

Specification forming part of Letters Patent No. **189,082**, dated April 3, 1877; application filed July 11, 1876.

To all whom it may concern:

Be it known that WILLIAM CLOUGH, deceased, late of Madison, Jefferson county, State of Indiana, did invent certain new and useful Improvements in Sugar Boiling and Evaporating Pans, of which the following is a specification:

This invention has for its object such a construction of evaporating-pan as that a great extent of heating-surface may be gained over ordinarily-constructed pans, and whereby a decided current of boiling fluid may be secured, emanating at the point of most violent agitation, and, after circulating and cooling, returning again to be reheated in the process of gradual evaporation; and this invention consists, in connection with the evaporating-pan, of one or more underlying pipes, having connection with the pan at the side or sides and at the middle, to increase the heating-surface, rapidity of boiling, and create a steady and rapid circulation.

Figure 1 is a perspective view of a sugar-evaporating apparatus embodying my invention. Fig. 2 is a transverse section of the same.

A is the evaporating-pan, of ordinary construction, having evaporating-compartment *a* and any number of finishing-compartments, a^1, separated by partitions provided with gates a^2. The compartment *a* rests upon a furnace, B, of any desired construction—shown in the drawing, however, with brick walls and the usual fire-grate. Secured upon the bottom of the pan A, and extending along into the furnace somewhat, are a series of pipes, C, having side connections *c* with the pan, and central connections c^1 of increased capacity. The pipes extend, preferably, at one end beyond the walls of the furnace, and are provided with cap-covered ends c^2, by means of which the pipes may be cleaned when desired.

The operation of this apparatus is as follows: The liquid to be evaporated in the process of making sugar is placed in the compartment *a*, and a fire applied in the furnace B. The liquid, in filling the compartment *a*, necessarily pervades the space in pipes C *c* c^1, thereby giving an increased heating-surface, and, as a natural consequence, more rapid evaporation. The fire on the grate-bars *b* being always of greater intensity at its center than at the edges, consequently the greatest heat is applied to the pipe C at or near c^1, and to the central portion of the compartment *a*. This unequal application of heat, therefore, causes a current of boiling fluid from the center of compartment *a* and of the pipe C c^1 toward the outer extent of the compartment, from which, consequently, there is a reflow through aperture *c* back to pipe C, and thence again up and through aperture c^1 into the center of the compartment. In this manner there is a constant searching flow of the boiling current through a great extent of heating-surface, which must necessarily produce the most rapid, even, and thorough evaporation—a result of great value in the manufacture of sugar.

It is known that evaporating-pans have heretofore been provided with pipes, or their equivalents, descending into the combustion-chamber of the furnace for the purpose of increasing the heating-surface and the agitation of the juices to be boiled or evaporated. This invention goes beyond the mere use of such pipes in connection with evaporating-pans in this, that the pipes are arranged separately across the combustion-chamber of the furnace, and connect, each pipe at both ends and at the center, with the bottom of the pan, the result of which arrangement is the peculiar happy effect already spoken of.

What I claim as the invention of the said WILLIAM CLOUGH, deceased, is—

The combination, substantially as specified, of the evaporating-pan, and the pipes arranged underneath thereof, transversely across the combustion-chamber, and connected, by vertical pipes, at both ends and in the center, with the bottom of the pan.

In testimony of which invention I hereunto set my hand.

WILLIAM V. CLOUGH,
Administrator.

Witnesses:
ROBERT CRAVENS,
WILLIAM TODD.