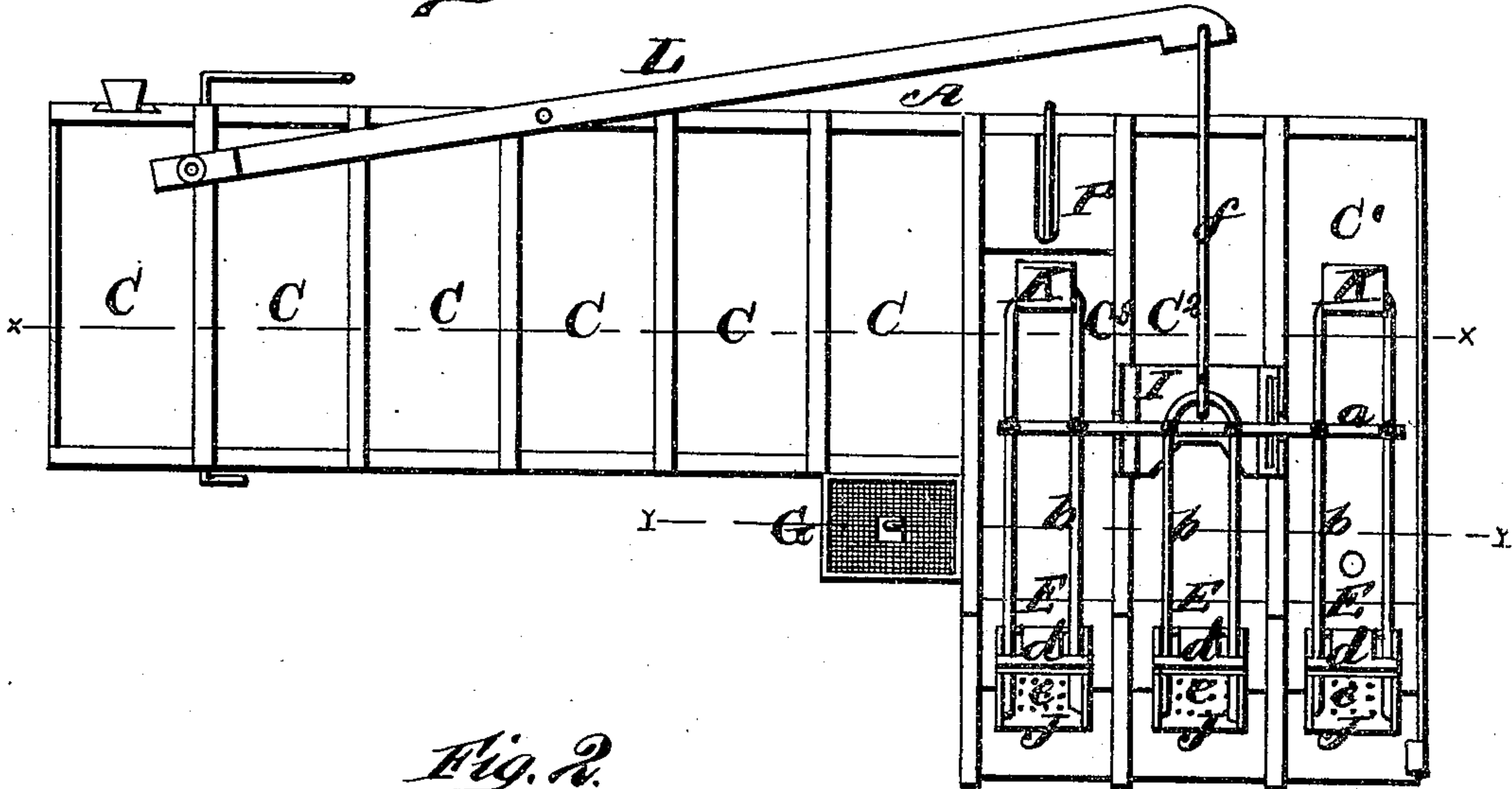


J. GRISWOLD.  
Evaporating-Pan.

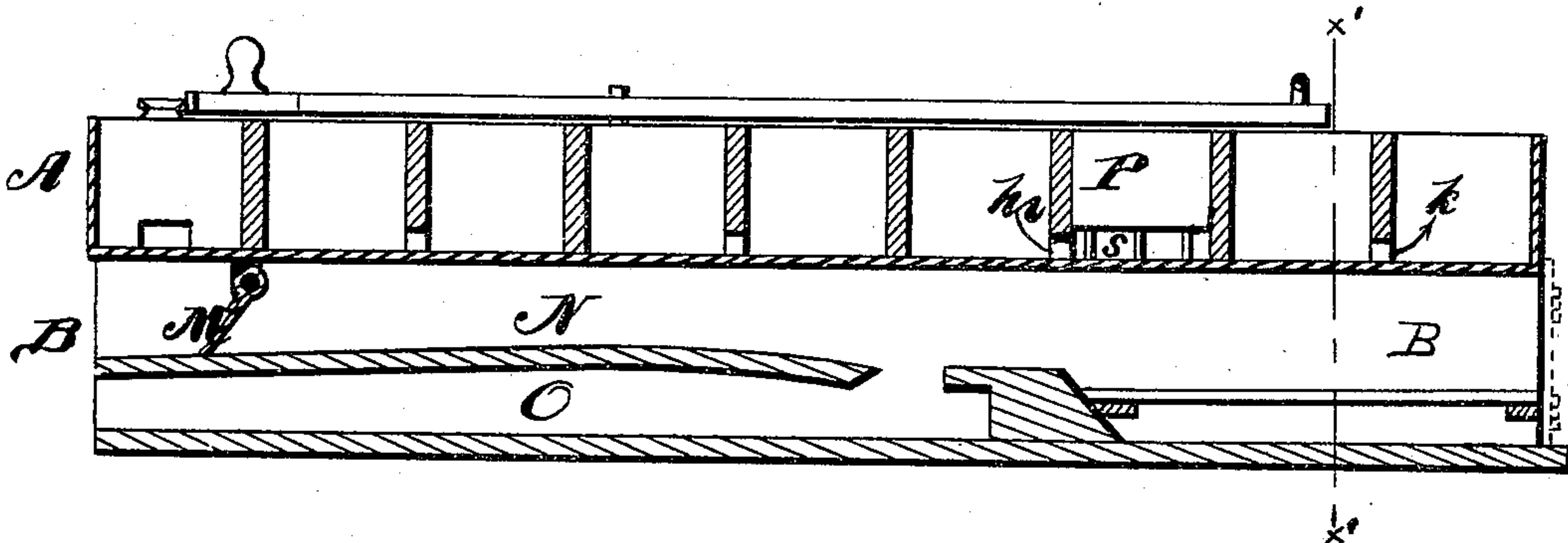
No. 201,110.

Patented March 12, 1878.

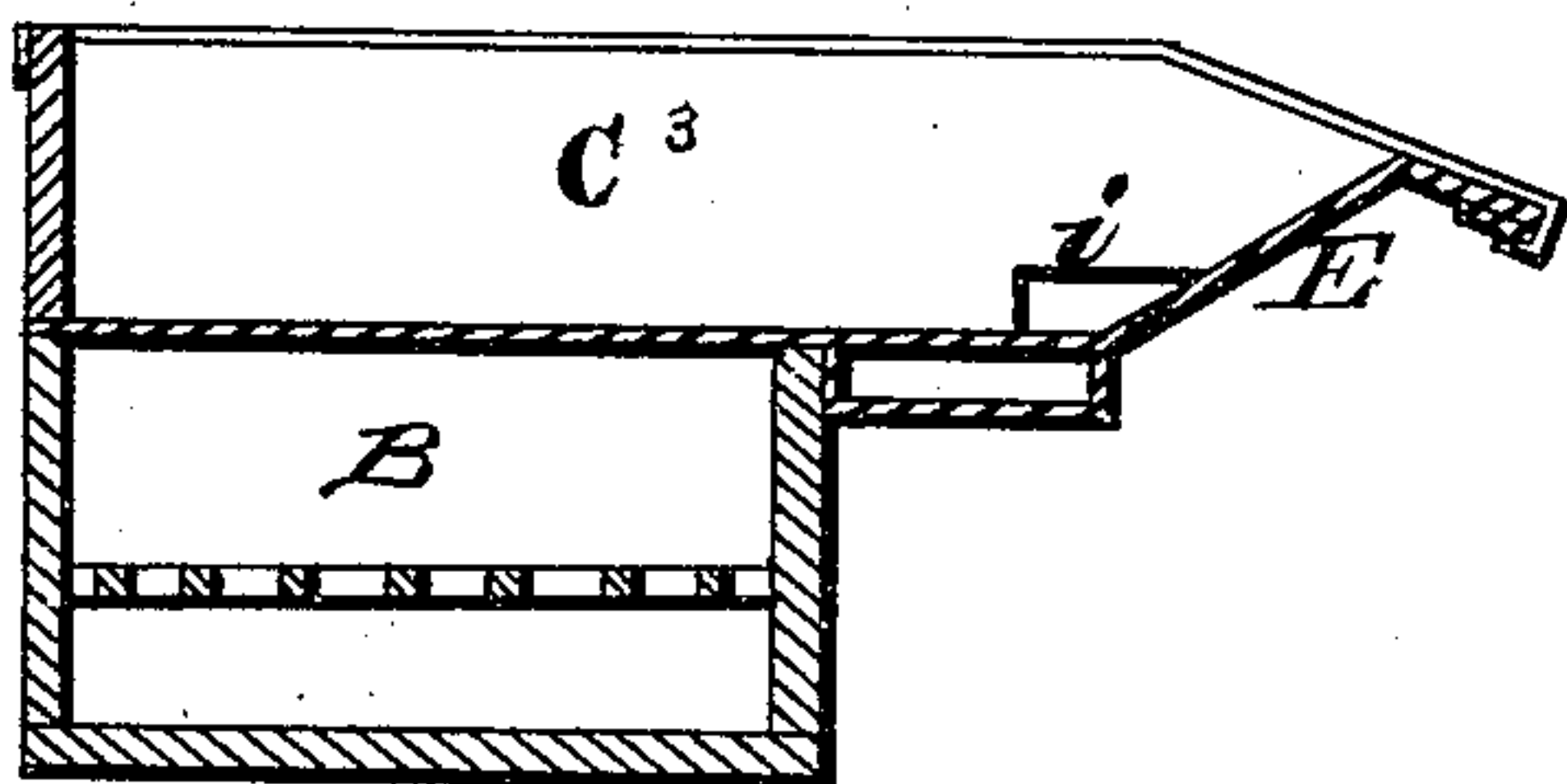
*Fig. 1.*



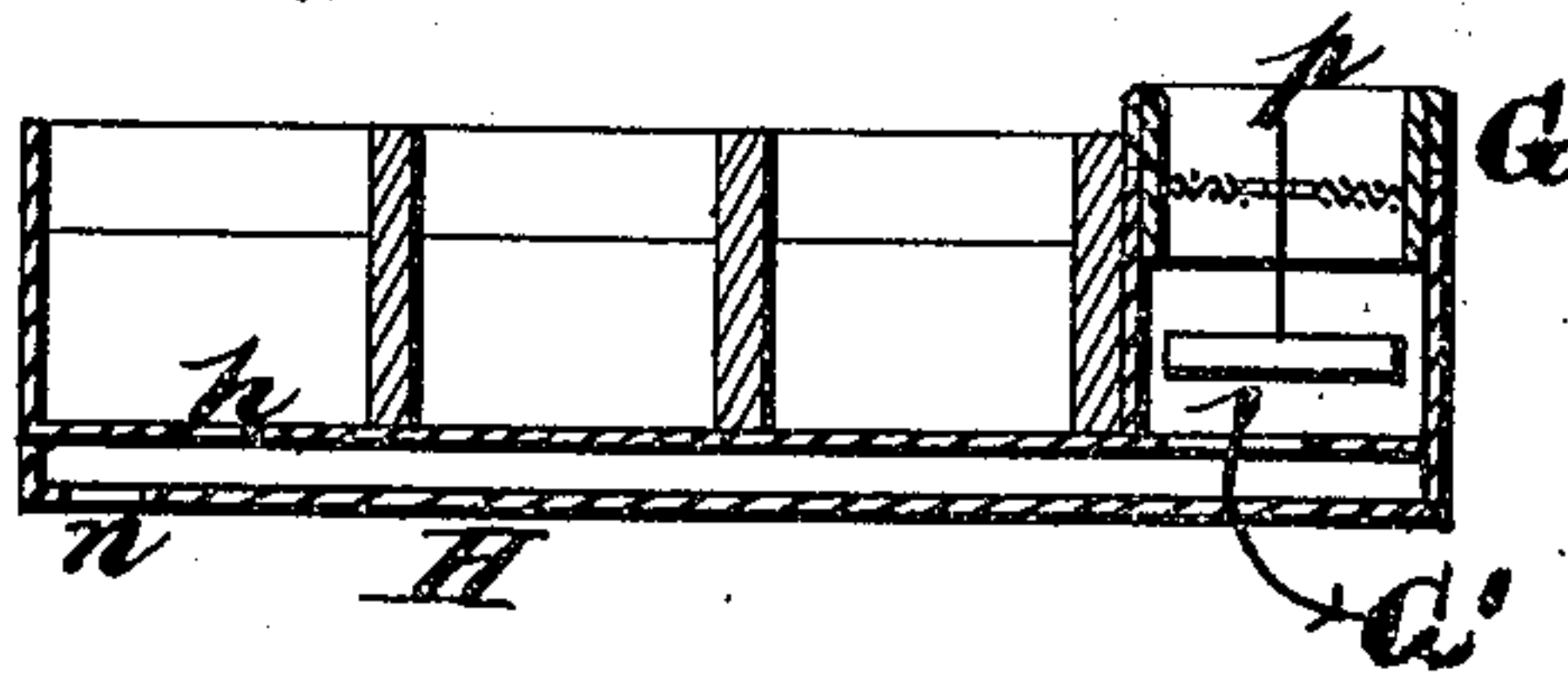
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



WITNESSES  
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# UNITED STATES PATENT OFFICE.

JOHN GRISWOLD, OF FANDON, ILLINOIS.

## IMPROVEMENT IN EVAPORATING-PANS.

Specification forming part of Letters Patent No. **201,110**, dated March 12, 1878; application filed July 7, 1877.

*To all whom it may concern:*

Be it known that I, JOHN GRISWOLD, of Fandon, in the county of McDonough and State of Illinois, have invented a new and valuable Improvement in Evaporating-Pans; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a plan view of my evaporating-pan. Fig. 2 is a longitudinal vertical central sectional view, taken through line *x x*, Fig. 1. Fig. 3 is a transverse vertical sectional view, taken through line *x' x'*, Fig. 2; and Fig. 4 is a sectional detail of the same, taken through line *y y*, Fig. 1.

My invention relates to evaporators for the manufacture of molasses and sugar from sorghum and other sugar-producing plants; and the nature of my invention consists, essentially, in the construction and arrangement of devices by which the green, impure substance or scum is separated and removed from the juice; in a cooling apparatus arranged to prevent the agitation of boiling from mixing the scum that has once risen with the juice again; and in the combination of parts, all as hereinafter more fully set forth.

The annexed drawings, to which reference is made, fully illustrate my invention.

A is the evaporating-pan, placed on top of the furnace B, and provided with a series of transverse partitions, which divide the pan into three chambers,  $C^1 C^2 C^3$ , at the end immediately over the fire, and a series of chambers, C C, for the remainder of its length.

The chambers  $C^1 C^2 C^3$  are, on one side, extended a suitable distance beyond the side of the furnace, and at the outer end of each of these chambers the bottom forms inclines E E, as shown.

G is a box, into which the juice is fed, and from the same extends a cooler, H, under the projecting ends of the chambers  $C^1 C^2 C^3$ . On the partitions dividing these chambers is placed a movable carriage, I, carrying a shaft, *a*, to which are attached three pairs or sets of

spring-arms, *b b*, for supporting the skimmers J J. These are made in the form of a pan, open at the front, and provided with perforated bottoms *e*. From the back of each pan extends a T-shaped arm, *d*, which is placed between the spring-arms *b b*, and the ends of these arms *b* are bent outward, and sprung into holes made in the side flanges of the skimmer. The two outer pairs of arms *b* are, at their rear or inner ends, provided with counterbalancing-weights K, while the middle pair or set is, by a rod, *f*, connected with a pivoted lever, L, as shown, for operating the skimmers.

In the manufacture of molasses and sugar from sorghum, or similar articles, one of the essential points is the removal of the scum without its having boiled under again after once rising; for if it does get mixed with the juice by boiling or other disturbance after the juice is partially cooked, no amount of boiling and skimming will remove it without the use of drugs, which are neither economical, palatable, nor conducive to health. This green substance can be effectually removed from my evaporator, for its cells are much larger than the cells of the juice—unless its cells are disturbed and broken; and as the skimmers can be made of material so finely perforated that unbroken scum-cells will not pass through, while juice-cells will pass freely, it is easy to perceive that the two will be separated if a proper place is provided for the scum to collect and rest without being broken up by the boiling process. Such a place is provided in my evaporator by the cool juice constantly flowing beneath that portion outside the furnace in each of the three skimming-chambers or sections  $C^1 C^2 C^3$ .

By this arrangement there can be no mixing of green with partially-cooked juice, for the green juice flows in through the feeder G in a regular stream sufficient to supply the evaporator, and, passing beneath the sections  $C^2 C^3$ , rises considerably heated through the inlet *h* into the section or chamber  $C^1$ , and as violent boiling goes on at the inner end of this section, and, in fact, in all three of the skimming-sections, the scum rises to the surface of the foam, and naturally flows down to the



outer cooler ends of said sections, where it never boils, and there remains until taken off by a stroke of the skimmers.

It will be observed that the juice rises at *h* considerably heated, so that it boils at the other end of the first section, and receives one skimming before passing through the port *i* into the second section  $C^2$ , and another skimming before passing through *k* into the third section  $C^3$ , and still another before it passes through *m* into the sections *C*.

Thus no hand skimming will be found necessary, excepting when first starting up in the morning, and not then if the bottom of the evaporator is covered with spring or well water, and the juice allowed to follow it and be skimmed.

The cooler *H* can easily be cleaned of sediment each evening by closing the opening *h* and opening a passage, *n*, beneath the cooler and throwing in water at *G*.

In the feeder *G* is a float,  $G'$ , which is to be connected by a wire, *p*, with a stop-cock or faucet in the feed-pipe, and thus regulate the feed, whereby the depth of the juice in the evaporator is also regulated. This is of great importance, as a uniform depth of juice is essential to a nice working of the skimmers, and saves much watching and trouble.

Under the rear end of the evaporating-pan is a damper, *M*, working as follows: From the fire-box of the furnace *B* the smoke and heat passage is divided into two flues, *N* and *O*, the flue *N* running next to and immediately beneath the bottom of the evaporator, and the other, *O*, one or two feet under ground, but meeting in one common chimney at the rear end of the pan.

The molasses or sirup frequently becomes so thick in the last three or four sections *C* that it would be impossible to prevent burning if an active fire were kept; but by closing the damper *M* the current of heat is made to take the lower flue *O*, and while the heat and boiling in the skimming-sections  $C^1$   $C^2$   $C^3$  remain unchanged, the other sections are protected from the heat to any extent desired by the operator.

By experiments I have found that the best location for this damper is at the point as shown in the drawing, because, as the heat naturally ascends, it is unnecessary to close the under flue at any time, for when the upper one is open the heat all passes through it, and the damper being placed far back from the

fire does not burn out so much, and at all times serves as a protection to the sirup in the last section, where it is almost always thick and easily scorched.

At the inner end of the chamber or section  $C^3$  is shown a wooden block, *P*, for the purpose of throwing the scum off to the other end of said section, thereby preventing any scum from passing through *m* into the section *C*. The heat accumulates under this block, and causes the most active boiling to take place just at the open end of the block, and throws all the scum off toward the cooler end.

In a working evaporator there should be one of these blocks in each of the three skimming-sections, but especially in the third section  $C^3$ , and they are raised up by pins *s* about three-fourths of an inch from the bottom.

One person can operate this evaporator with perfect ease. The juice is supplied at *G* and regulates itself. The operator stands at the opposite side, and by means of the lever *L* performs the skimming. The damper is also at this point, for regulating the heat; and a slide, *R*, in the last section *C*, is on the same side, for regulating the outflow of the sirup, while under his immediate observation are all the sections that may have thick sirup in to need his attention.

The various parts of the evaporator may be made of any material most suitable for the purpose.

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

1. The cooler *H*, extending from the feeder *G* under the extended skimming-sections  $C^1$   $C^2$   $C^3$ , for the purposes herein set forth.
2. The skimmers *J*, constructed as hereinbefore described and suspended from the spring-arms *b*, substantially as herein set forth.
3. The combination of the skimmers *J*, arms *b*, shaft *a*, carriage *I*, weights *K*, and operating-lever *L*, substantially as and for the purposes herein set forth.
4. The blocks *P*, supported upon pins *s* in the inner ends of the skimming-sections, for the purposes herein set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

JOHN GRISWOLD.

Witnesses:

ROBERT JEFFRIES,  
MINTON HATFIELD.