

(No Model.)

2 Sheets—Sheet 1.

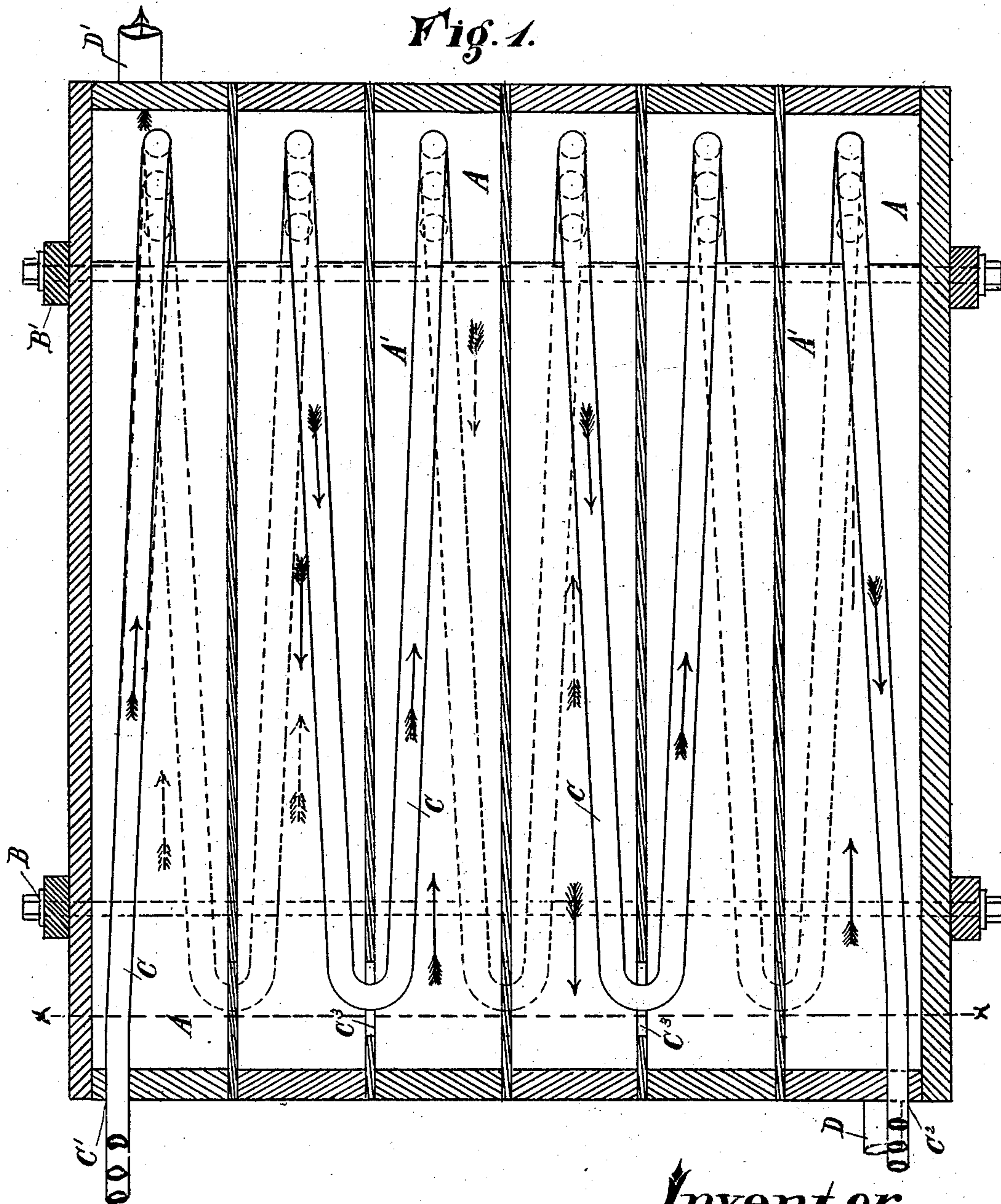
T. HAYES.

APPARATUS FOR COOLING MASH, &c.

No. 298,202.

Patented May 6, 1884.

*Fig. 1.*



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2 Sheets—Sheet 2.

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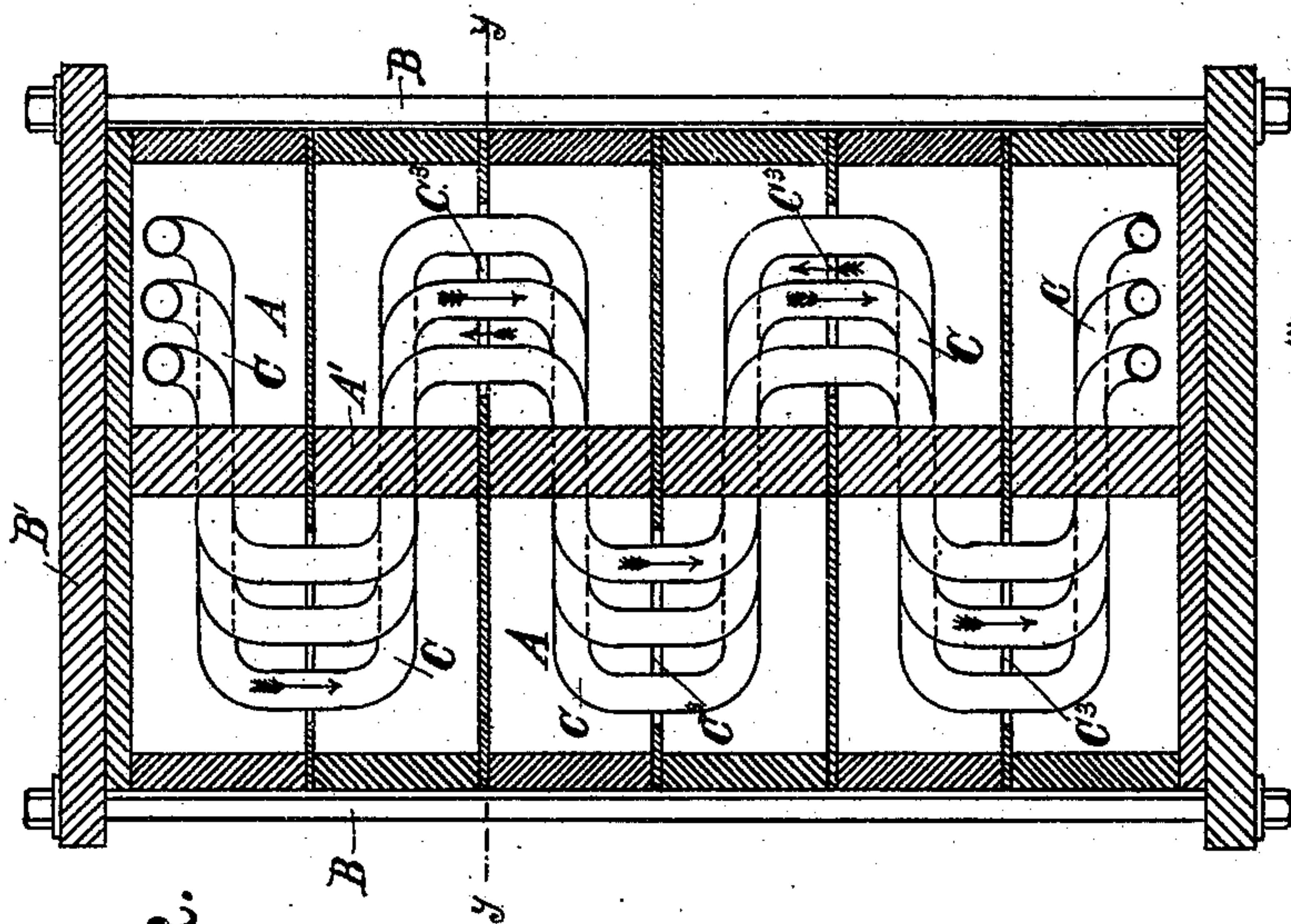


Fig. 2.

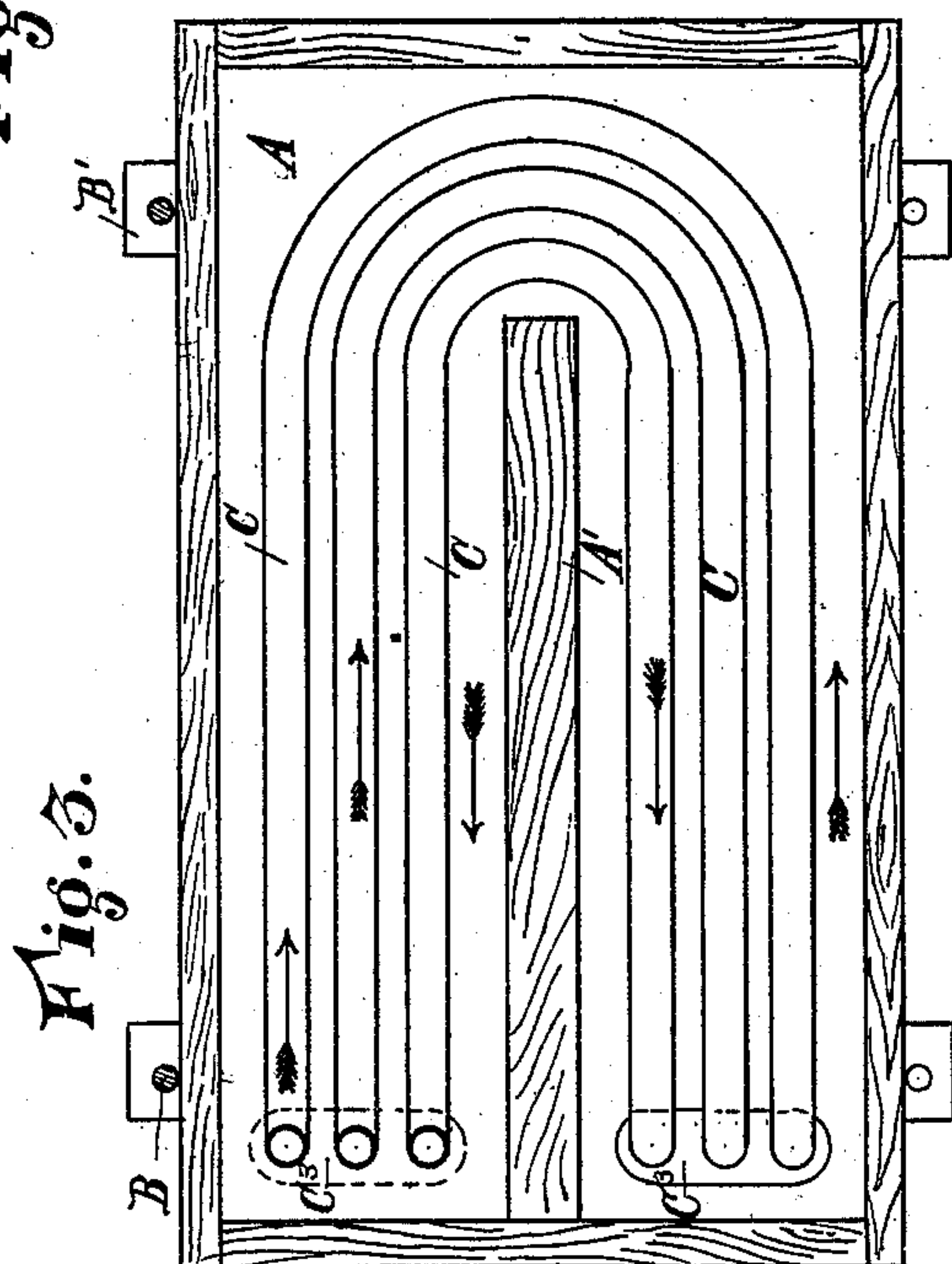


Fig. 3.

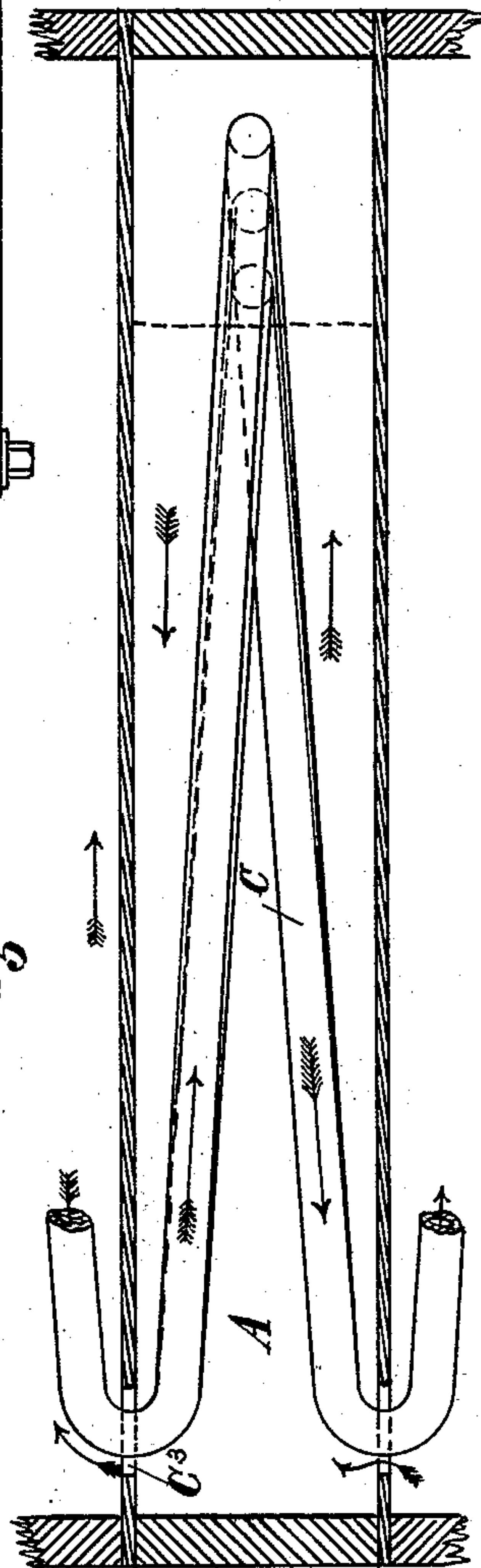


Fig. 4.

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# UNITED STATES PATENT OFFICE.

TIMOTHY HAYES, OF ANDERSON'S FERRY, OHIO.

## APPARATUS FOR COOLING MASH, &c.

SPECIFICATION forming part of Letters Patent No. 298,202, dated May 6, 1884.

Application filed November 17, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, TIMOTHY HAYES, of Anderson's Ferry, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Apparatus for Cooling Mash, &c., of which the following is a specification.

My invention relates to apparatus for the cooling of mash wort, beer, and for the condensation of spirit-vapor in distilleries and similar establishments; and it consists of a simple arrangement of rectangular wooden chambers horizontally disposed, containing a single or multiple descending coil of copper or other suitable material, through which coil the hot mash or other substance descends by gravity while the cooling water is being forced upward from chamber to chamber by the aid of a force-pump.

The cooling apparatus for above-mentioned purposes hitherto in use is inefficient, troublesome, and expensive; and the object of my invention is the construction of a cooler more especially for the cooling of mash in distilleries, which, while furnishing a maximum of efficiency of water expended and in the cooling of the hot mash, shall be simple in form, easily and cheaply built, and capable of quick repair when necessary, all of which will be fully explained hereinafter.

In the accompanying drawings, Figure 1 is a sectional elevation of my improved cooling apparatus. Fig. 2 is a transverse vertical section on line *xx* of Fig. 1. Fig. 3 is a plan view on line *yy* of Fig. 2; and Fig. 4 is an enlarged sectional view of one chamber and the contained mash pipe or coil, showing the general descending pitch of the pipe.

Similar letters of reference indicate similar parts.

Referring to the drawings and several figures thereof, *A A* are parallel rectangular wooden chambers, of which any convenient number may be employed, and which are provided with wooden bottoms and made water-tight, under moderate pressure, at the joints, stacked one above the other, as shown in Figs. 1 and 2, and finally bound tightly together by the tie-bolts *B* and binders *B'* at top and bottom of cooler. The joint between the top of one chamber *A* and the bottom of next chamber *A* above it must be such as to prevent leakage of

water when the whole is bound together, and under pressure sufficient to force the water through so much of the apparatus as lies above any particular point.

*C C C* are the mash pipes or coil, constructed of copper or other suitable material, of which any desired number may be employed, which enter the upper chamber at *C'* and descend in constant pitch from the entry end of each chamber to the exit end thereof, as shown in Fig. 4, and from one chamber to the next below to the lowermost chamber of the cooler, where they pass out at *C''*. A suitable connection is made with the mash pipes or coil *C* at *C''*, to conduct the cooled mash to the customary fermenting-tubs. The coil *C* may contain several pipes, as shown, or a single pipe of oblong section with the major axis placed horizontally; but several pipes, as *C C C*, of circular section are to be preferred. A partition, *A'*, set longitudinally in the center of each chamber *A* directs the cooling-water from right to left in one side or compartment of the chamber, and from left to right in the opposite compartment thereof, while the coil *C* is so formed that it enters the chamber *A* at one end, passes from left to right through one compartment around the partition *A'*, and then from right to left in the opposite compartment to the point of exit. At the point *C''*, where the mash-coil *C* passes downward from one chamber into the next lower chamber an oblong hole is cut through the bottoms of chambers *A*, considerably larger than the space represented by the coil, through which spaces the water required for cooling flows upward from a lower chamber into the next chamber above. The cooling-water enters the lower chamber at the pipe *D*, and passes through chambers *A*, openings *C''* around the partitions *A'*, and finally vents from the overflow *D'* in the top chamber, as clearly shown by the arrows in the chambers *A*, while the hot mash enters the coil *C* at *C'*, and descends by gravity through the several chambers of the cooler, and finally vents at the point *C''*, as shown by the arrows on the coil. The general course of so much of coil *C* as lies in each chamber *A* is downward at a regular or uniform pitch for the entire circuit, up one compartment of the chamber, around the partition *A'*, and down the other compartment of the chamber. The directions

of flow of the cooling-water and of the hot mash are opposite, and the number of chambers A and length of coil C may be increased until the maximum efficiency of the cooling-  
5 water and the thorough cooling of the mash is obtained.

A cooler such as I have described may be used instead of the present worm and worm-tub for condensing spirit-vapor; but when this  
10 is done the coil should be made much larger at the top than at the bottom, after the manner of proportioning the section of the common worm.

Having described my invention, what I  
15 claim is—

The cooler consisting, essentially, of a se-

ries of communicating chambers, A, arranged one above the other, and each provided with a longitudinal partition, A', dividing each chamber into two compartments communicating at  
20 one end, in combination with a coil, C, of a constant descending pitch, passing through the series of chambers from top to bottom and around the partition in each chamber, substantially as described.

In testimony whereof I have signed my name  
25 to the foregoing specification in the presence of two subscribing witnesses.

TIMOTHY HAYES.

Witnesses:

CILAS. ANDERSON,  
JOSEPH W. SIMS.