

(No Model.)

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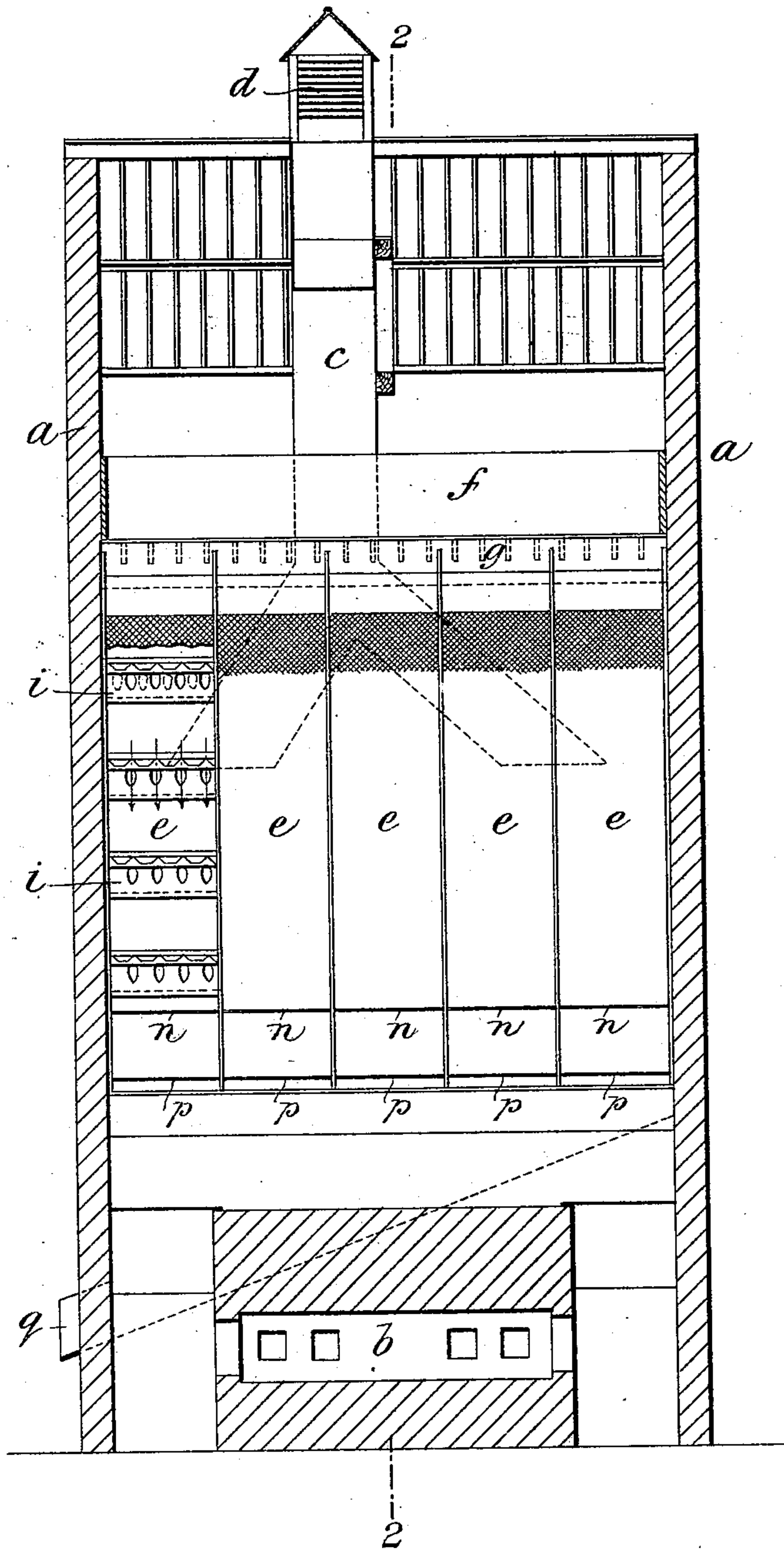
J. WHITE.

APPARATUS FOR DRYING BARLEY, MALT, &c.

No. 513,694.

Patented Jan. 30, 1894.

Fig. 1.



WITNESSES:

*Fred White*  
*Thomas H. Wallace*

INVENTOR

*James White,*  
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*Arthur C. Braser & Co.*

(No Model.)

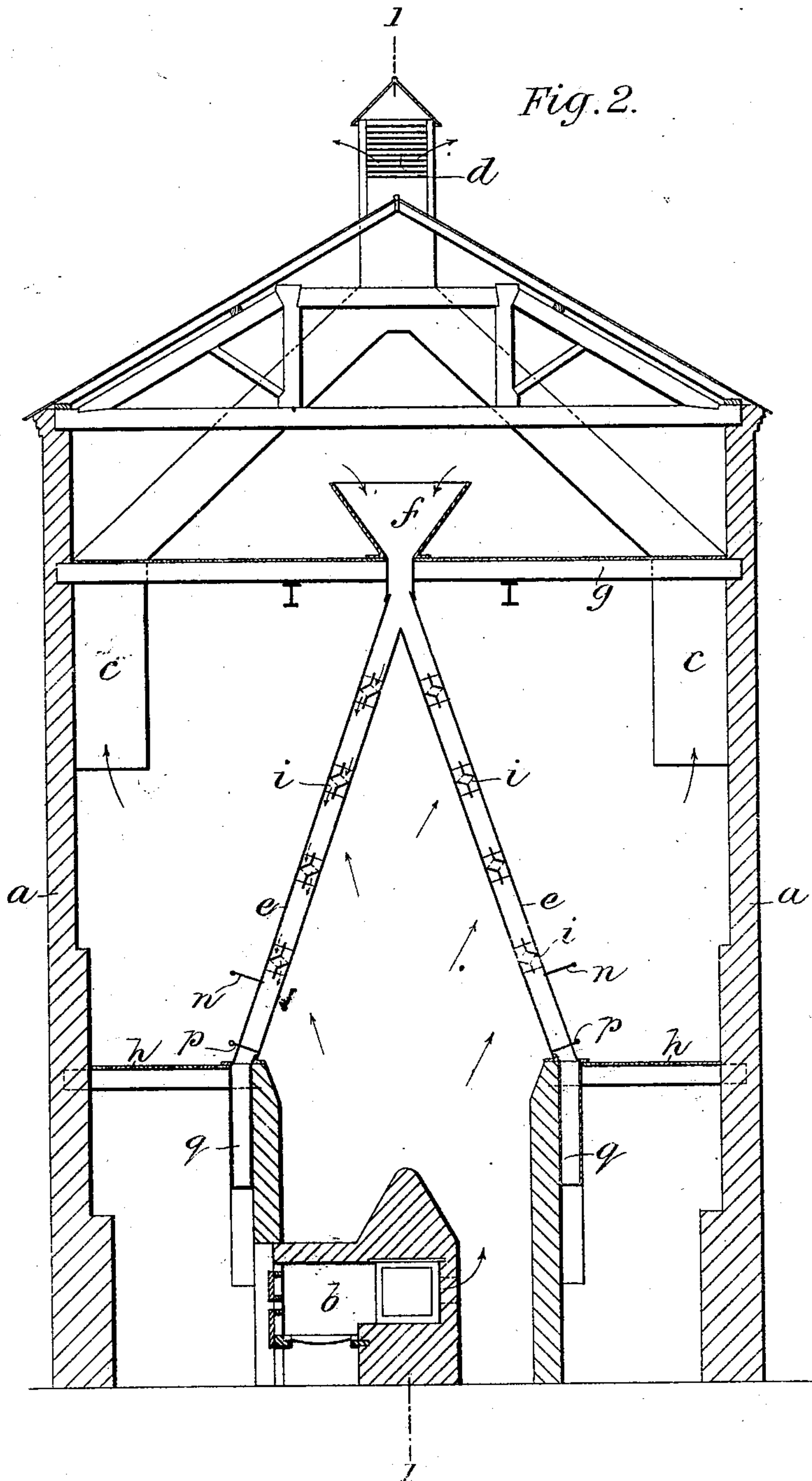
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Fig. 3.

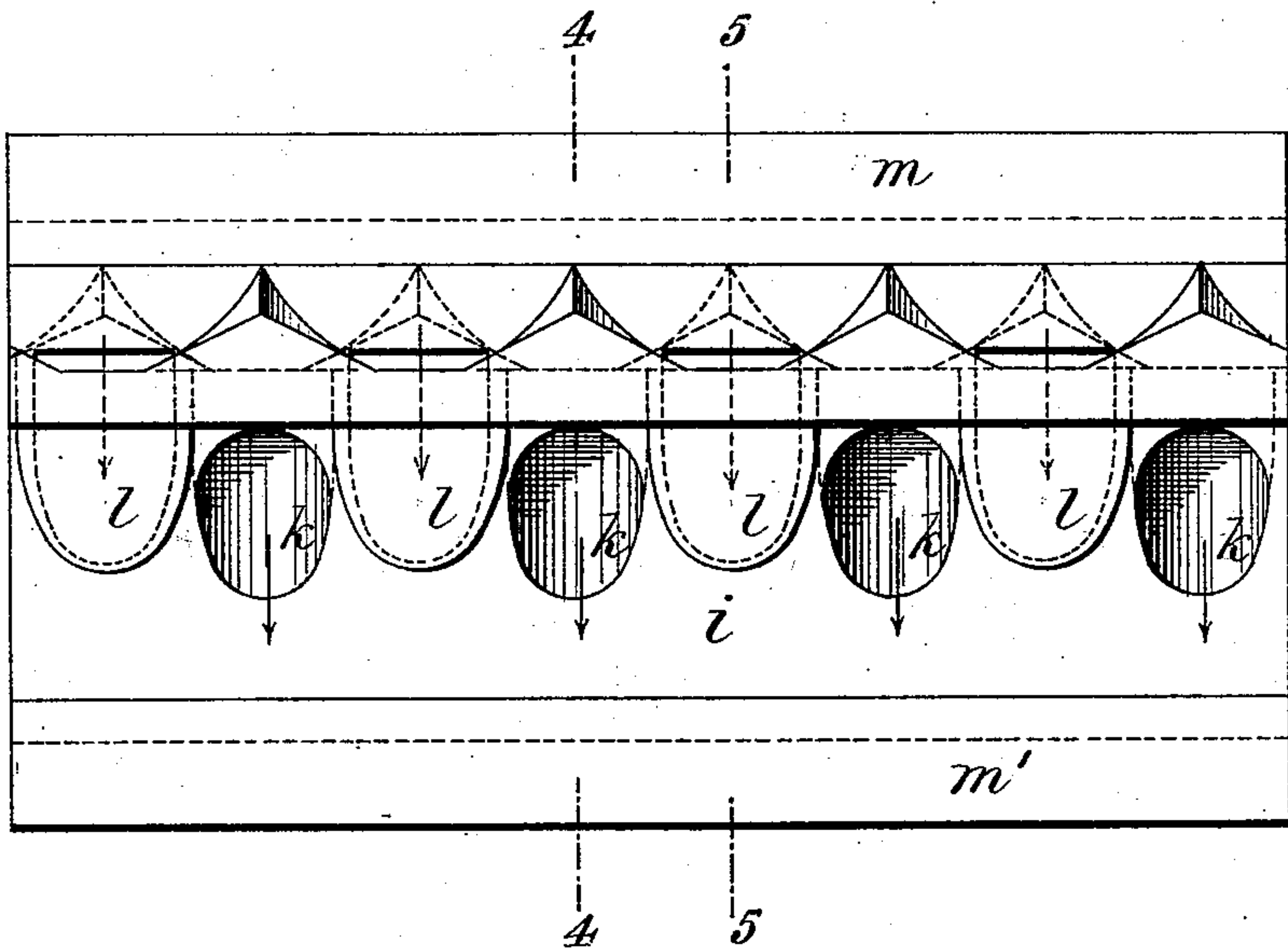


Fig. 4.

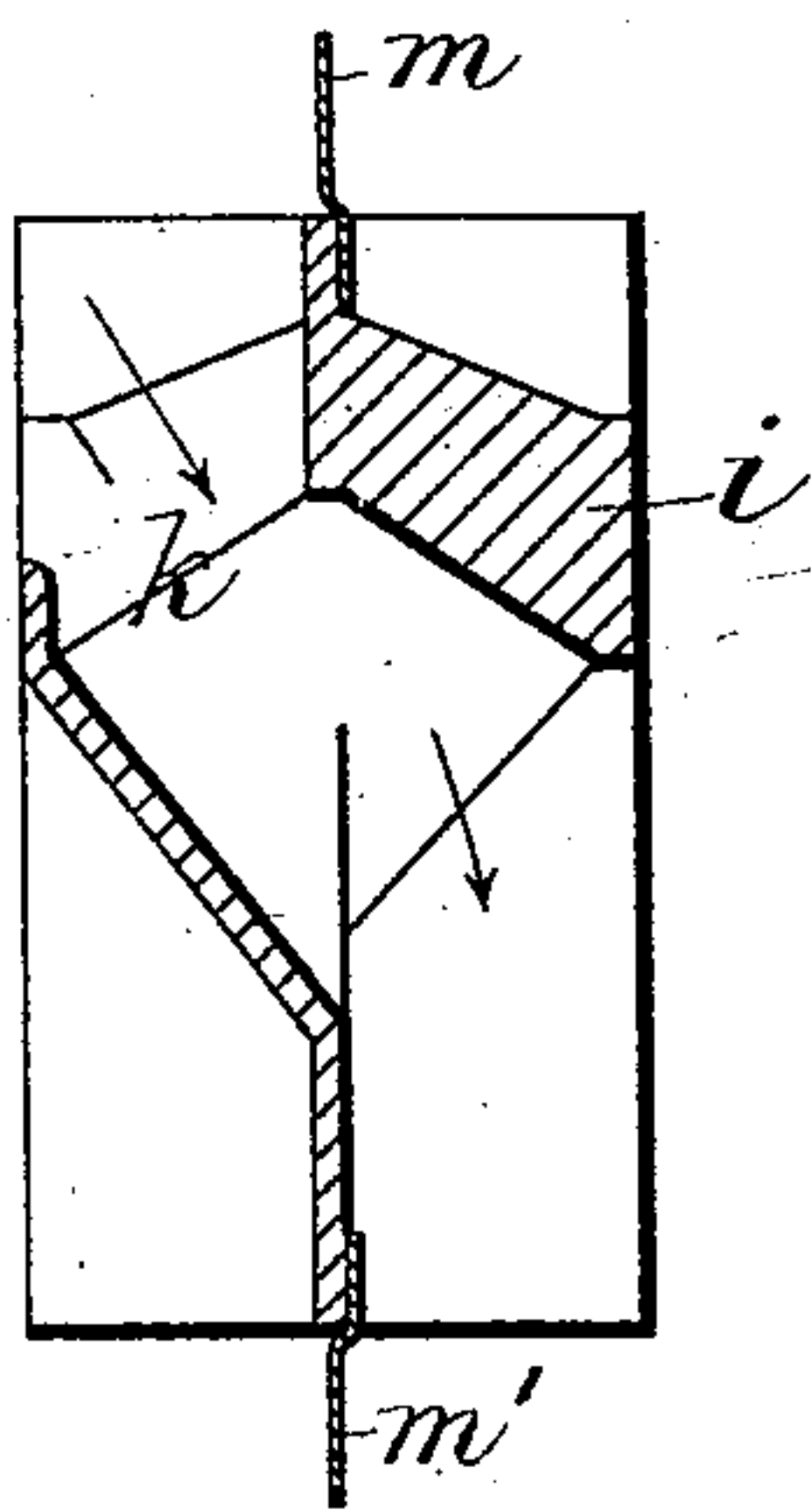
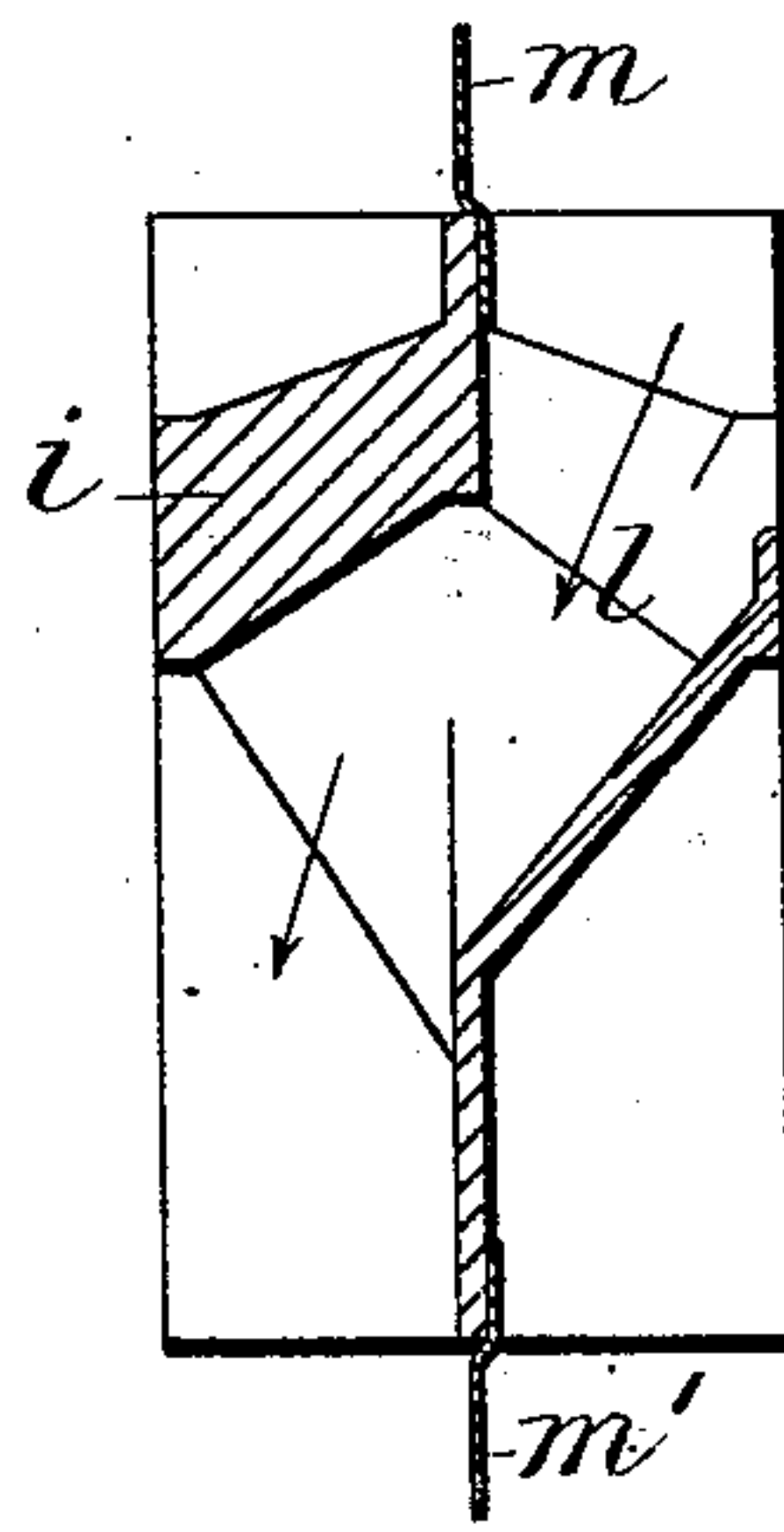


Fig. 5.



WITNESSES:

Fred White  
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# UNITED STATES PATENT OFFICE.

JAMES WHITE, OF LONDON, ENGLAND.

## APPARATUS FOR DRYING BARLEY, MALT, &c.

SPECIFICATION forming part of Letters Patent No. 513,694, dated January 30, 1894.

Application filed October 14, 1893. Serial No. 488,127. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES WHITE, of London, England, have invented certain new and useful Improvements in Apparatus for Drying Barley, Malt, Oats, Wheat, or other Substances of a Granular or Pulverulent Nature, of which the following is a specification.

My invention has reference to apparatus for drying barley, malt, oats, wheat or other substances of a granular or pulverulent nature.

The invention mainly consists in the construction within a kiln or drying house of an inclined or vertical channel formed with foraminous sides and divided transversely at suitable intervals into chambers the bottoms of which contain cross passages, which passages when the barley or other material which is supplied to the upper end of said channel is allowed to run or flow from one chamber to that next below, transfer the material that was at and near the respective sides of the upper of the two chambers to the opposite sides of the lower chamber, whereby the material gets well mixed and turned over and is consequently more uniformly dried than if it were merely allowed to slide bodily from chamber to chamber.

The invention further consists in the combination with the said cross passages at bottom of each compartment of a central tongue or board projecting up from between said cross passages, and of a central tongue or board projecting down from between said cross passages, the said tongues serving as guides or dividers for the material as it respectively enters and leaves said passages. The lowest chamber does not require cross passages at bottom but has a slide or shutter at top and another slide or shutter at bottom. When the apparatus is inoperative the bottom slide is normally kept closed and the upper one open, and the two slides are worked at intervals to allow the material in the several chambers to move down one stage, that is to say to the extent of one chamber. To effect this the upper slide is first closed and the bottom slide is then opened to allow the lowest chamber to empty itself into a chute or receptacle. The bottom slide is then closed and the top slide opened, when every chamber (except the lowest) will empty itself through the cross passages into the chamber next below and become filled from the chamber next

above, the top chamber receiving its supply from a hopper or otherwise.

In carrying out the invention it will be convenient to employ two inclined channels divided transversely as above described, the two channels meeting at the top so as to form a sort of  $\Lambda$ , and they may both be supplied by the same hopper. Further it will be well to have a number of inclined channels, say five more or less, placed abreast, each of them meeting at the upper end another inclined channel so as to form a  $\Lambda$ .

In the accompanying drawings:—Figure 1 is a vertical section on the line 1—1 of Fig. 2 of a kiln or drying house fitted with my improved apparatus, the foraminous material of one of the inclined channels being broken away so as to allow the bottoms of the chambers to be seen. Fig. 2 is a vertical section of the kiln on the line 2—2 of Fig. 1. Fig. 3 is a side elevation on a larger scale of the bottom of one of the chambers together with the upper and lower dividing tongues. Fig. 4 is a section on the line 4—4 of Fig. 3, and Fig. 5 is a section on the line 5—5 of Fig. 3.

Referring to the drawings *a* represents the kiln or drying house and *b* a stove or fire place for heating the same.

*c c* are air outlet passages leading from the interior of the kiln to the final outlet *d* at top. *e e* represent two sets of inclined channels of which there are five in each set, but I do not limit myself to this number. The five channels of the one set are shown as respectively meeting the five channels of the other set, but this is not essential.

*f* is a hopper from which the ten channels receive their supply of barley, oats or other material to be dried. The hopper and the upper ends of the channels are supported by the floor *g* and the lower ends of the channels are supported by the floors or platforms *h h*. Each channel *e* is divided transversely into compartments; five compartments are shown in each channel but I do not limit myself to this number. The bottom of each compartment except the lowest is formed by a transverse partition *i* in which are two sets of passages *k* and *l*; these two sets cross each other as clearly seen in Figs. 3, 4 and 5, so that the passages *k* open at top at one side of the upper compartment and at bottom at the opposite side of the next lower compartment, traversing the partition *i* at an inclination, while



the passages *l* open at top at the other side of the upper compartment and at bottom at the opposite side of the next lower compartment, traversing the partition *i* at an inclination reversed to that of the passages *k*. Thus the contents passing down through the passages *k* are transferred from the inner to the outer side of the channel, and the contents passing down through the passages *l* are transferred from the outer to the inner side of the channel in a certain and simple manner.

Between the tops of the passages *k* and those of the passages *l* is a central tongue or board *m* projecting up from and extending the whole length of the partition *i*, and between the bottoms of the passages *k* and those of the passages *l* is a similar central tongue or board *m'* projecting down from said partition. At the top of the lowest compartment of each channel *e* is a slide or shutter *n* which is normally open, and at the bottom of said compartment is a slide or shutter *p* which is normally closed. The slides *n p* can be opened and closed as required by men on the platforms *h h*. Below the lowest compartment is a chute *q* into which the material in said compartment falls when the bottom slide *p* is opened, and which delivers it outside the kiln. The lowest compartments of all the channels *e* of one set communicate with one common chute *q*, but a separate chute may be provided for each channel when required. In the arrangement shown there is a separate chute *q* for each set of five channels.

The operation of the apparatus will be readily understood. All the compartments of all the channels being filled with the material to be dried, the bottom shutters *p* being closed and the top shutters *n* open, and the kiln being heated, the drying proceeds. When it is desired to cause the material in any given channel to descend to the distance or extent of one chamber the upper slide *n* of that channel is first closed and the lower slide *p* opened so that the contents of the lowest compartment discharge themselves into the chute *q*; the slide *p* is then closed and next the slide *n* is opened and the contents of every compartment of the channel then discharge themselves into the compartment next below, the top compartment being automatically refilled from the hopper *f*. As the material passes from one compartment to another the cross passages *k* and *l* cause it to change sides in the channel this change being assisted by the upper and lower tongues or dividers *m* and *m'*.

Instead of the kiln or drying house being heated by an internal stove or fire place as shown in the figures it may be heated in any other convenient manner, such for example as by hot air from an external air heating stove connected with the kiln or drying house by a flue or flues.

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

1. In a drier in which granular or pulverulent material is dried in its passage down an inclined or vertical channel, the channel in combination with a transverse partition there- in dividing it into compartments, said partition having two series of inclined cross passages those of the one series inclined in reverse direction to those of the other series, whereby as the material traverses said passages from one compartment to the other the portion passing through one series of said passages is reversed in position relatively to that passing through the other series of said passages, substantially as and for the purpose set forth.

2. In a kiln or drying house in which barley, malt, oats or other granular or pulverulent material is dried in its passage down an inclined or vertical channel, the combination with transverse partitions in said channel dividing same into compartments and having cross passages to transfer the material from one side to another of said channel as said material passes from one compartment to another, of an upper and a lower projecting tongue on each partition to guide or divide said material as it enters and leaves said cross passages, substantially as set forth.

3. In a drier for drying granular or pulverulent material, a channel down which the material to be dried passes, in combination with a transverse partition, said partition constructed with reversed cross passages, one of such passages leading from the outer side of the channel at top to the inner side thereof at bottom, and the other such passage leading from the inner side of the channel at top to the outer side thereof at bottom of said partition, said partition dividing said channel into compartments, and the lowest compartment having a movable shutter at top and a movable shutter at bottom, in combination with a hopper to feed the upper end of said channel and a chute to receive the dried material discharged from the lower end of said channel, substantially as set forth.

4. In a drier for drying granular or pulverulent material, a feed hopper *f* in combination with two channels *e e* for said material meeting at and supplied by said hopper and inclined in opposite directions, two discharge chutes *q q* respectively to the two channels, and transverse partitions *i* in said channels dividing the latter into compartments, said partitions each having reversed cross passages *k* and *l* for transferring said material from one compartment to another, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES WHITE.

Witnesses:

ROBERT THOMPSON,  
THOMAS LAING WHITEHEAD.