

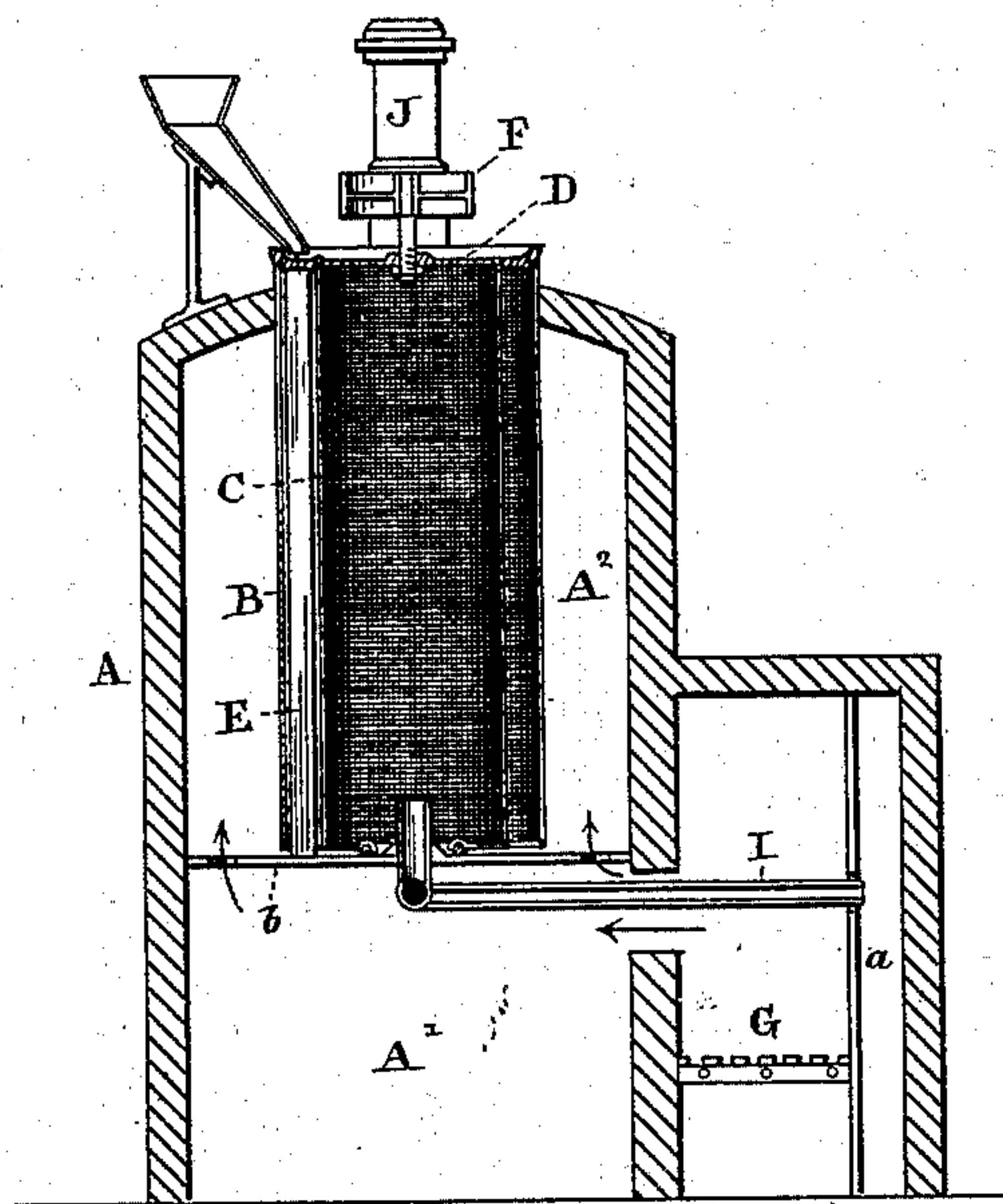
(No Model.)

J. BARCLAY.

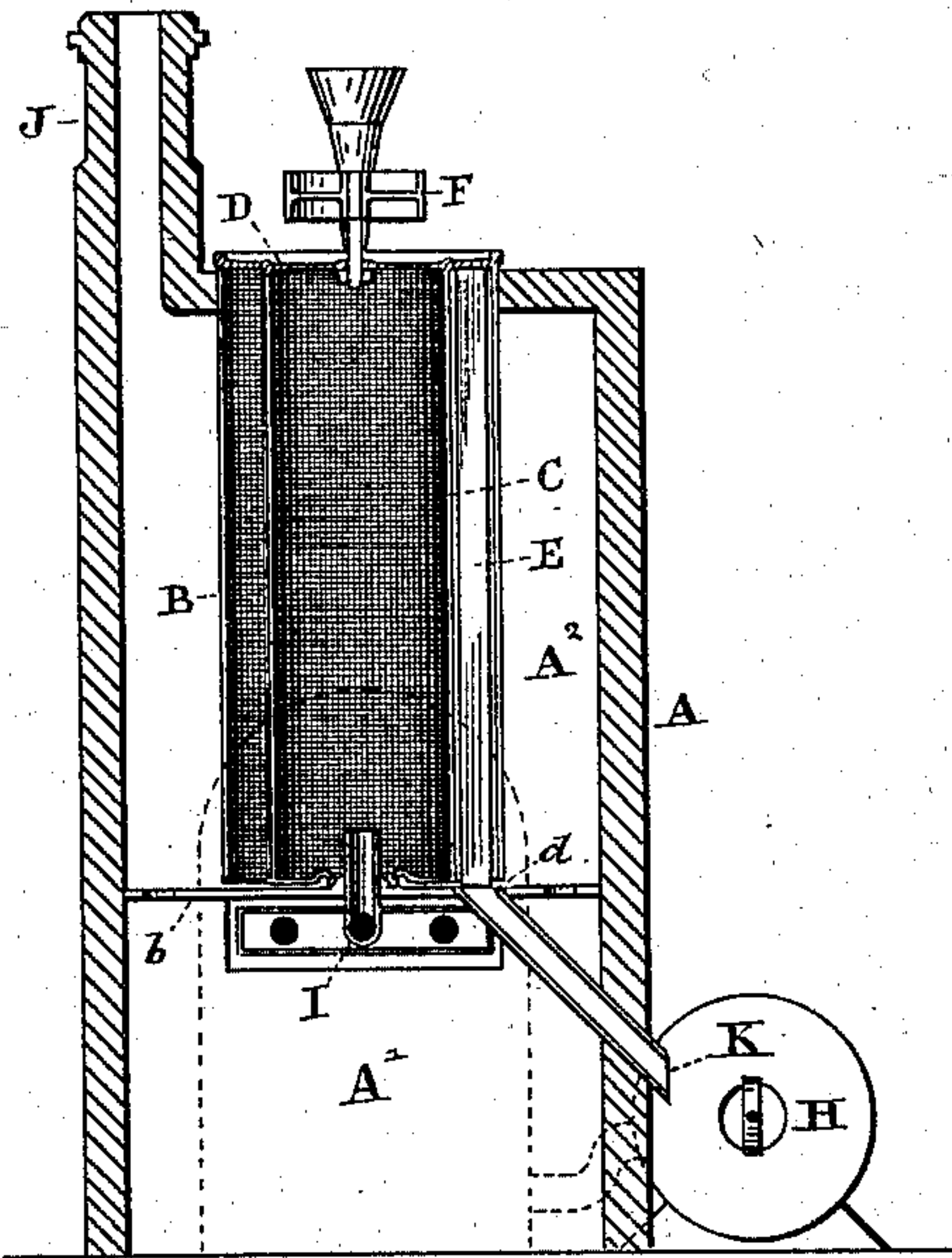
APPARATUS FOR DRYING GRAIN.

No. 255,564.

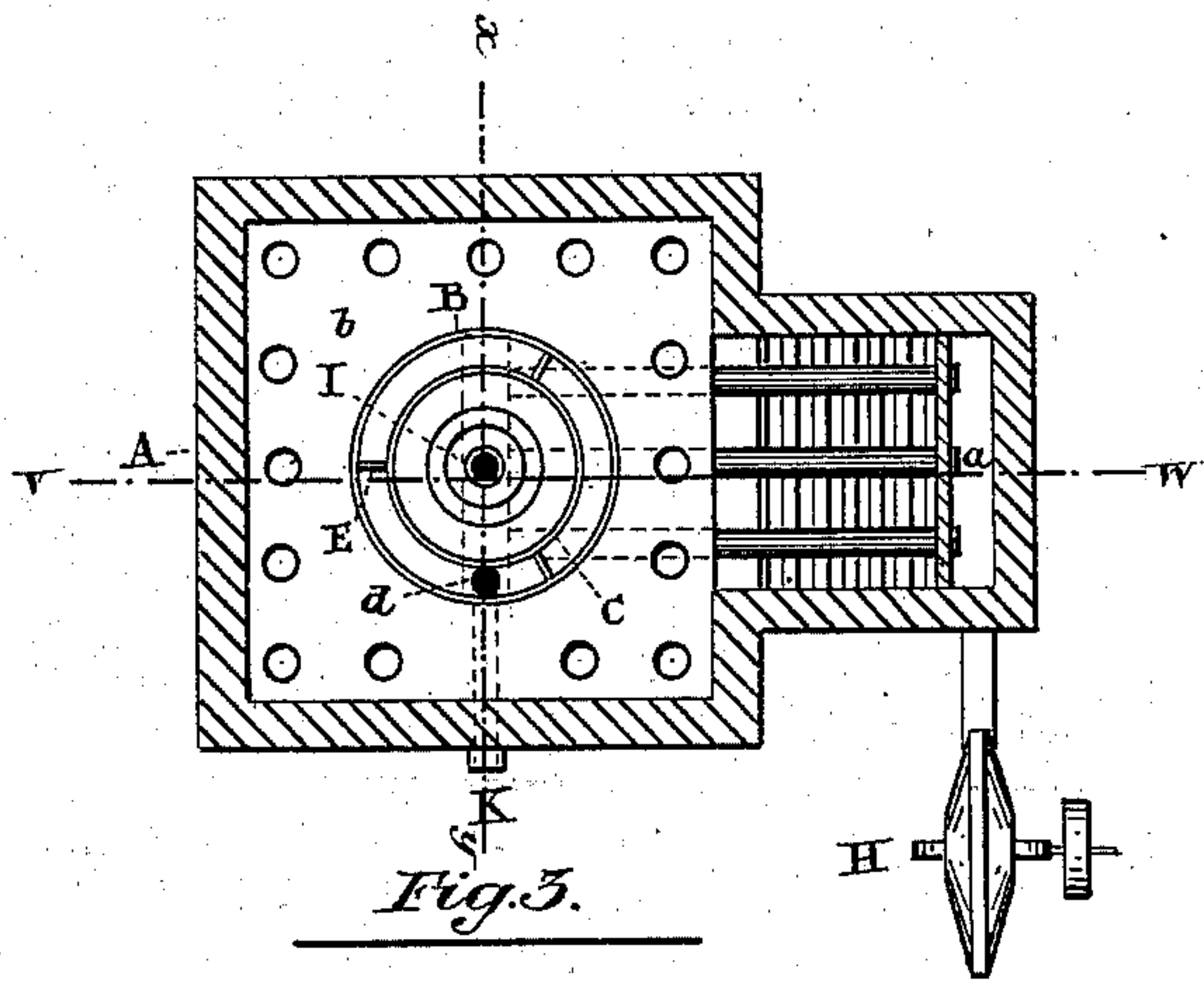
Patented Mar. 28, 1882.



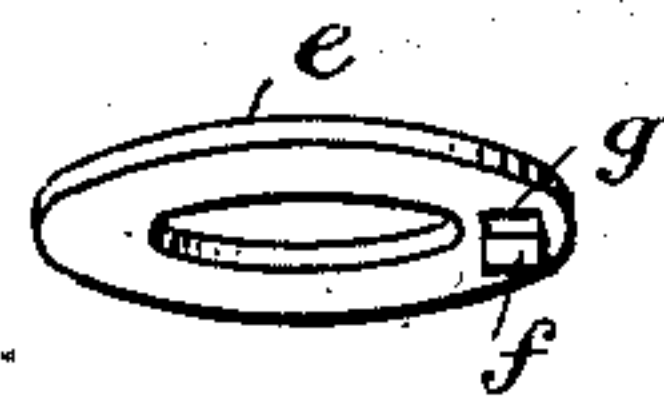
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



*Fig. 4.*

Witnesses

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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR DRYING GRAIN.

SPECIFICATION forming part of Letters Patent No. 255,564, dated March 28, 1882.

Application filed December 15, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN BARCLAY, a subject of the Queen of Great Britain, residing at the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented a certain new and useful Apparatus for Drying Oats and other Grain, of which the following is a specification.

The object of the invention is to produce a machine in which the full effect of the fire may be secured for the purpose of drying oats and other grain without permitting the same to be injured by the smoke; and it consists essentially of two vertical perforated cylinders, one placed within the other so as to leave a space between the circumference of the two, which space is filled with the grain to be dried. Air under pressure is introduced into the inner cylinder, which air finds its way through the perforations in the cylinder and through the grain contained between them into the outer chamber, through which the smoke from the furnace passes, but is prevented reaching the grain through the pressure of the escaping heated air.

The flues and other details of construction are arranged substantially as hereinafter explained.

In the drawings, Figure 1 is a section on line *vw* on Fig. 3. Fig. 2 is a section on line *xy* on Fig. 3. Fig. 3 is a horizontal section. Fig. 4 is a view of the ring.

A is the outer casing or walls of the machine, preferably made of brick, but which may be constructed of iron.

B is a perforated cylinder placed vertically within the casing A, and having placed within its diameter a similar perforated cylinder, C. This latter cylinder is provided with a cap, D, and when the cylinders are made to revolve the inner cylinder, C, is connected to the outer cylinder, B, by means of the vertical slats or partitions E. These partitions divide the space between the inner and outer cylinder into compartments for containing the grain.

F is a pulley fixed to the center of the inner cylinder. This pulley is suitably connected to a motor power for causing the cylinder to revolve; but instead of the pulley it will of course be possible to provide gearing or other means for conveying the desired rotary motion to the cylinders.

G is a furnace, preferably situated on the outside of the casing A. On one side of the furnace G, I form an air-space, *a*, which air-space is connected with the pressure-fan H, and is provided with tubes I, passing through the furnace G into the lower smoke-chamber, A', wherein they communicate with an air-flue leading into the inner cylinder, C. Owing to this connection, it will be seen that the air forced into the air-space A by the fan H will, while passing through this space and through the tubes I, become heated before finding its way into the cylinder C. The smoke from the furnace passes, as indicated by arrows, from the furnace G into the lower smoke-chamber, A', from whence it escapes through perforations made in the floor *b* into the upper chamber, A<sup>2</sup>, finally escaping through the chimney J.

It will thus be seen that the heat of the fire is thoroughly utilized, the air which is forced into the cylinder B, being heated by passing through the air-space on one side of the furnace and through the tubes which pass over the fire and into the lower smoke-chamber, which is thoroughly heated by the smoke, not only heating the tubes in the lower chamber, but while passing through the upper chamber it heats the outer cylinder, but is prevented from entering into the grain contained between the two cylinders by the pressure of the heated air escaping through the perforations in the cylinders.

In order that the grain may be thoroughly dried and at the same time be automatically withdrawn, I provide means by which a small quantity of grain will escape at stated intervals. There are several means by which this desired end may be accomplished. One plan, which I think will be found preferable, is to arrange the cylinders so that they may be caused to revolve slowly within the upper chamber, A<sup>2</sup>, their lower ends being pivoted upon the floor *b*. A hole, *d*, is made in the floor *b*, immediately below the space between the two cylinders, this hole being about the same diameter as the width of the said space, and is provided with a spout, K, leading out of the lower chamber, A. As the cylinders revolve, the partitions E cause the grain to travel around also, and as in this manner all points in the circumference will at some time during their revolution come opposite to the hole *d*,



the grain will be removed with regularity from the space around the entire circumference of the cylinder. As the grain is thus removed that remaining between the cylinders will be  
 5 constantly shifted, which action is so desirable during the process of drying it. The fact of the cylinder revolving will be found a great advantage, as it is probable that all parts of the chamber A<sup>2</sup> will not be heated to an equal  
 10 temperature. Consequently, were the cylinders to remain stationary, some portions would become more heated than other parts. This is overcome by causing the cylinders to revolve, as all parts in turn will thereby be subjected  
 15 to the same heat.

While I consider the revolving cylinders of great advantage, it will of course be seen that the grain may be removed without this action. To accomplish this a ring might be placed on  
 20 the bottom of the cylinders, closing the space between the two. This ring would be caused to revolve, and, having a hole in its bottom, would permit the escape of a certain portion of the grain, carried by a scraper placed on the bottom  
 25 of the wheel or ring, to the hole *d*, made in the floor *b*. To make this equivalent clearer, I exhibit the form of the bottom in Fig. 4. In this figure, *e* represents the ring made to cover the space between the two cylinders, and is provided with a scraper, *f*, on one side of the hole  
 30 *g*. It will thus be seen that the grain which falls through the hole *g* will be carried along the floor *b* till the hole *d* is reached, when it will escape through the spout *K*, so that the  
 35 grain may be withdrawn from it as required.

Instead of providing means, as described, by which the grain is withdrawn at regular intervals, a discharge-spout may be arranged to withdraw the grain in charges, in which case  
 40 means to cut off the supply should be provided.

I may also mention here that the apparatus may be arranged so that the smoke will pass through the center of the inner cylinder, and the air under pressure through the chambers.

45 I am aware that it is not new to force heated air through grain for the purpose of heating the same; and I am also aware that it is not new to force smoke and other products of combustion of a furnace directly against the grain,  
 50 and I do not claim either invention.

What I claim as my invention is—

1. The combination, with two perforated cylinders placed one within the other and adapted to hold grain between them, of a furnace,  
 55 means of supplying heated air under pressure, and passages for conveying the products of combustion from the furnace to one side of the cylinders and heated air under pressure to the  
 60 other side of said cylinders, substantially as and for the purpose specified.

2. The combination, with two revolving perforated cylinders adapted to hold grain between them, of a furnace and a pressure-fan, said furnace discharging its products of combustion  
 65 into a chamber surrounding the cylinders, and the pressure-fan forcing air through said furnace to the interior of the cylinder and through the sides of the same, substantially as described, and for the purpose specified.

3. In a machine for drying oats and other grain through the application of artificial heat, and in which the grain is contained between two revolving perforated cylinders, the one being placed within the other, the top of the inner cylinder being closed and its bottom connected to a blast-pipe leading from a pressure-fan, vertical partitions arranged to divide the space between the two cylinders into compartments, in combination with a floor placed below the revolving cylinder and provided with  
 80 a hole communicating with a spout through which the grain is discharged, substantially as specified.

4. The combination, with a receptacle for holding grain, and a chamber surrounding the same, of a furnace adapted to discharge its products of combustion into said chamber, an air-passage leading through said furnace from an air-space close to the latter, and adapted to discharge heated air within the space inclosed  
 90 by the grain receptacle, substantially as and for the purpose specified.

5. The combination, with a receptacle for holding grain, of a furnace, and means, substantially as described, for separately conducting the products of combustion of said furnace and the air heated by the same to the grain-receptacle, whereby the air acting against one face thereof will prevent the smoke and gases from passing through the opposite face to the  
 100 grain, as set forth.

6. The combination, with the perforated revolving cylinders B C, of the chamber surrounding said cylinders, the furnace G, the air-passage I, passing through said furnace, and  
 105 the perforated plate *b* at the base of the cylinders, substantially as and for the purpose specified.

7. The combination, with the revolving cylinders B C, of the furnace G and pipes I, the former discharging at the exterior of the cylinders and the pipes at the interior of the same, and means, substantially as described, for gradually discharging the grain from the space between the cylinders, as and for the  
 115 purpose specified.

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Witnesses:

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