

(No Model.)

3 Sheets—Sheet 1.

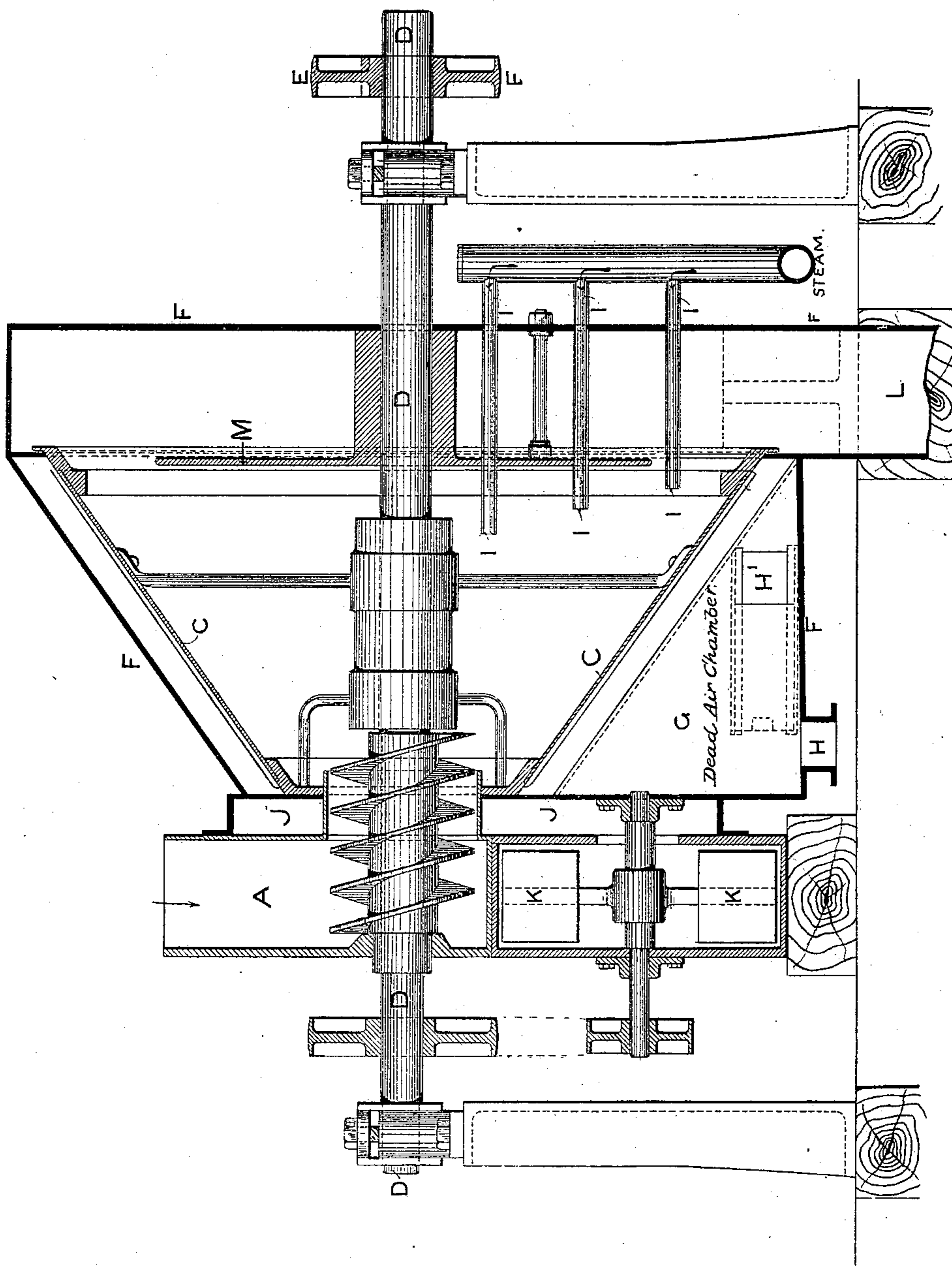
J. RITCHIE.

GRAIN CLEANING AND DRYING MACHINE.

No. 316,063.

Patented Apr. 21, 1885.

Fig 1



Witnesses.  
Jas. F. O'Hamel  
Matter J. Dodge

Inventor.  
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(No Model.)

3 Sheets—Sheet 2.

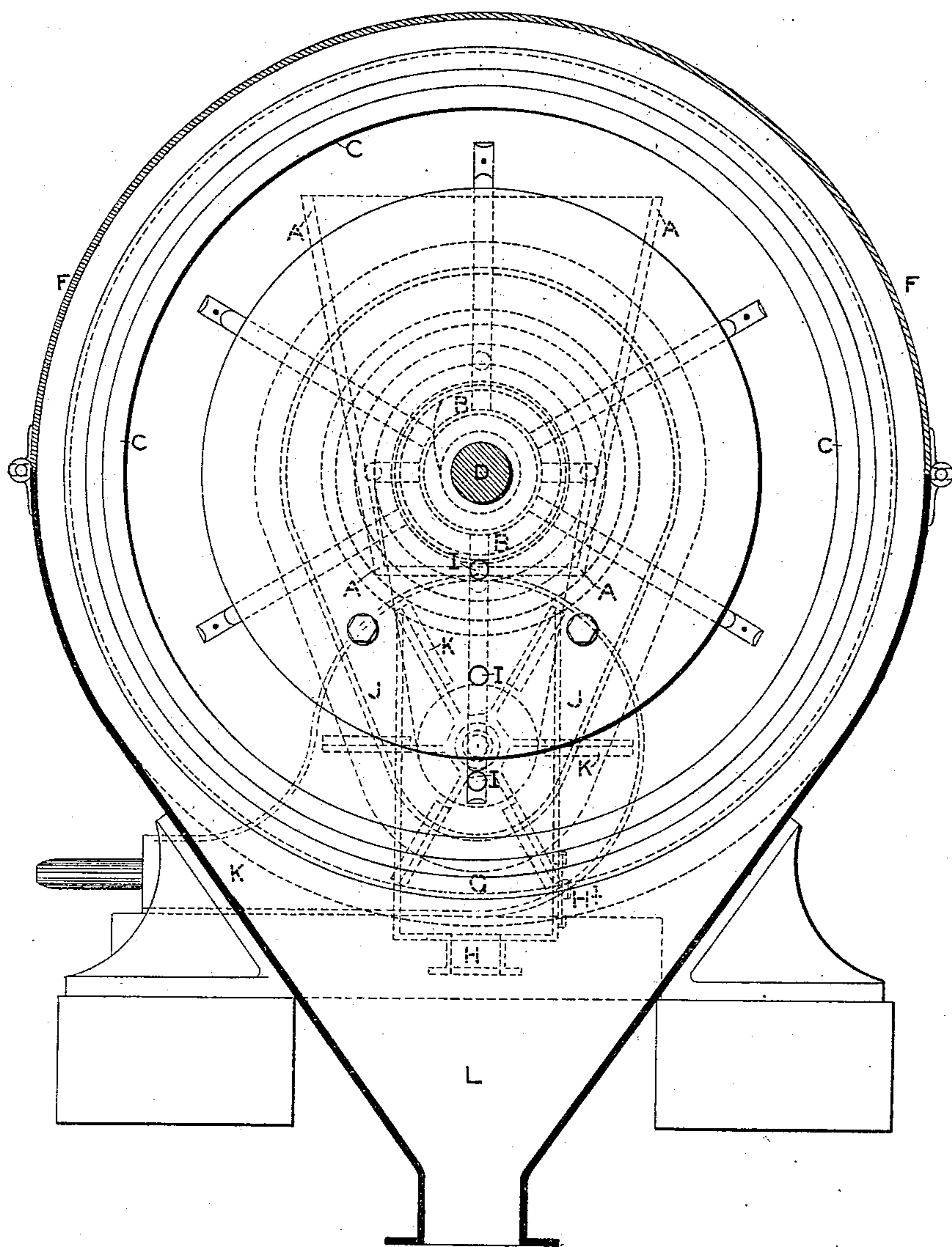
J. RITCHIE.

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Patented Apr. 21, 1885.

Fig 2



Witnesses.

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(No Model.)

3 Sheets—Sheet 3.

J. RITCHIE.

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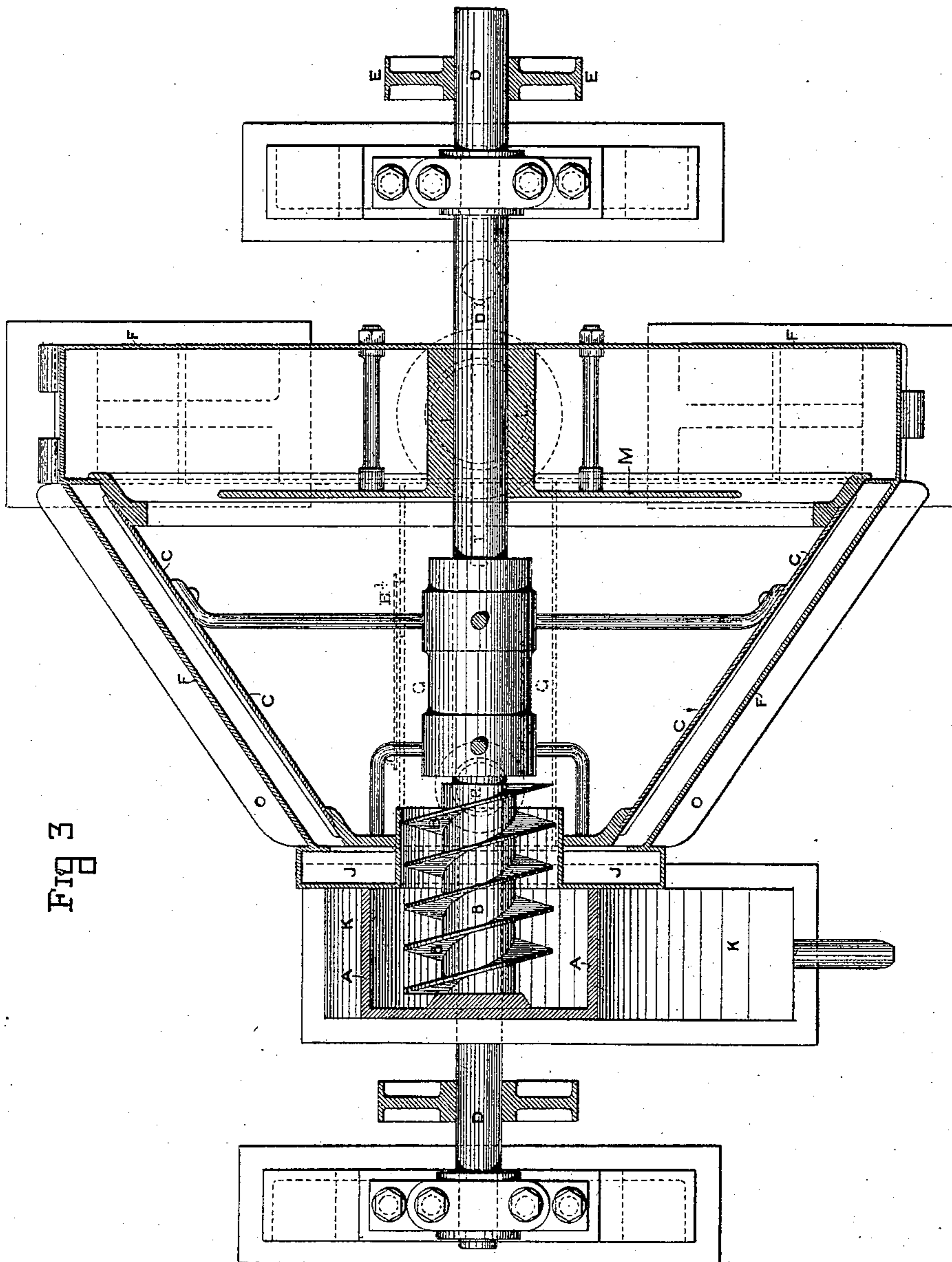


Fig. 3

Witnesses

Jas. F. O'Hamel  
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# UNITED STATES PATENT OFFICE.

JOHN RITCHIE, OF LIVERPOOL, COUNTY OF LANCASTER, ENGLAND.

## GRAIN CLEANING AND DRYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 316,063, dated April 21, 1885.

Application filed October 9, 1884. (No model.) Patented in England February 29, 1884, No. 4,114.

*To all whom it may concern:*

Be it known that I, JOHN RITCHIE, a subject of the Queen of Great Britain, residing at Liverpool, county of Lancaster, Kingdom of England, have invented certain new and useful Improvements in Grain Cleaning and Drying Machines, (for which I received Letters Patent in Great Britain, dated February 29, 1884, No. 4,114,) of which the following is a specification.

My invention relates to grain-cleaning machines; and it consists in a novel construction of the same, as hereinafter fully set forth and claimed.

In the drawings, Figure 1 is a vertical longitudinal section of my improved machine; Fig. 2, a rear end view, and Fig. 3 a top plan view with a part of the casing removed.

The object of this invention is to facilitate the operation of cleaning and drying the grain preparatory to grinding; and to this end it consists in introducing the grain into a rapidly-revolving wire-gauze cone, which, owing to centrifugal action, tends to throw the light particles of dust and dirt out through its meshes. This action is accelerated by a suction-fan placed at the smaller end of the revolving cone and in communication with the casing surrounding the same, and, further, by the action of the superheated steam discharged into or upon the grain in a direction contrary to its travel at the same time that the grain is subjected to the action of the suction-fan and the centrifugal action of the revolving cone. I would here state, however, that I am aware a suction-fan has been employed at the smaller end of a revolving wire-gauze cylinder to draw off the dust, and hence do not make any broad claim thereto; and I would also have it understood that I do not claim the employment of superheated steam for the purpose of drying grain.

By the particular construction now about to be described in detail, I have secured such results as I believe are impossible where only one or two of the plans heretofore referred to are used singly or combined.

A indicates the hopper of the machine, into which the material to be operated upon is fed; and B is an Archimedean screw in the bottom thereof, which causes a constant and uniform feed. The screw B is carried upon a shaft,

D, extending throughout the length of the machine, said shaft being carried in bearings at either end, as shown, and provided with a belt-pulley, E, by which motion may be imparted thereto. Shaft D also carries the conical wire-gauze cage C, suitably braced, as shown in Figs. 1 and 3, the forward narrow end of the cone being fitted snugly around the laterally-extending portion of the feed-hopper A.

F is a casing surrounding and completely inclosing the cone C, communicating at its forward end by means of a chamber, J, with the case of suction-fan K, while its rear end is fashioned into a discharge-orifice, L, and partially closed by a disk, M, secured to the shaft D. Immediately under the conical cage C the casing is formed into a dead-air chamber, G, provided with a discharge-spout, H, and also with sliding doors H' on the side, as shown in Fig. 1. The chamber G being below the body of the casing and practically closed at all points except the top, no appreciable eddies or currents will occur therein, but the material entering it will fall to the bottom of the chamber and come to rest or pass out through spout H. It is in this sense that the chamber is referred to as a dead-air chamber.

I I I indicate pipes which project inward through the rear end of the casing F, said pipes being supplied with superheated steam from a common supply-pipe, as indicated in Fig. 1. These pipes enter the rear end of the casing and extend inward parallel with the shaft D at different distances therefrom, forming nozzles, from the ends of which the steam is projected upon the grain as it travels outward from the smaller to the larger end of the cone C, thus tending to drive off the dust in a direction contrary to the travel of the grain, and in the direction in which the suction-fan draws.

In the drawings I have shown three pipes or nozzles, I, arranged one above another, and in practice I find it advantageous to use such number. It is apparent, however, that the number may be increased or diminished at will, a single pipe or a group of pipes being used as the size of the machine and the use for which it is designed may render advisable.

The operation of the machine is as follows: The grain, fed from hopper A by screw B, falls into the rapidly-revolving conical cage C, and,

owing to the inclination of the sides of the cage and the centrifugal action the grain, is fed toward the rear or large end of the cone, while the light dust and like impurities are forced out through the meshes of the cage C. As the grain thus moves down the inclined sides of the cone it is subjected to the action of the superheated steam-jets from the nozzles I, which tend to retard the movement of the grain, and while thus retarded to thoroughly clean it of all dirt and other light impurities. The impurities thus liberated are blown or forced through the meshes of the cone C, while the grain continues its movement and is discharged over the end of the cone into spout L. The heavier particles of dust and dirt set free by the centrifugal action of the revolving conical cage and by the steam-jets fall into the chamber G, and pass therefrom through orifice H, or can be removed from time to time through the doors H'.

During the operations just before described the suction-fan K has been revolving rapidly and created sufficient draft to cause all the light fluffy matters eliminated from the grain to pass through the meshes of cone C into casing F, and thence into the fan-casing, aided, of course, by the cone itself and the steam-jets.

In the use of the superheated steam care must be taken that it be not of such temperature as would char or burn the grain.

The machine has been found in actual use to give excellent results, the grain being in proper condition for milling after about an hour's time, whereas under former constructions it has been customary to allow the grain to stand for a day or more before milling.

Having thus described my invention, what I claim is—

1. In a grain cleaner and drier, the combi-

nation of a casing, a rotary conical cage therein, a suction-fan at the smaller end of the cage communicating with the casing, and steam-pipes at the larger end of the cage adapted to discharge superheated steam into the latter in a direction contrary to the feed or travel of the grain.

2. In a grain cleaner and drier, the combination of a casing, a revolving screen therein, a suction device at one end of said screen, and a steam-nozzle at the other end, all arranged to operate as set forth.

3. In a grain cleaner and drier, the combination of casing F, shaft D, cone C, provided with a feeding device, a suction-fan at the smaller end of the cone and communicating with the casing by a passage, J, nozzle I at the large end of the cone, adapted to project steam into the interior thereof, and dead-air chamber G immediately below the cone to receive the heavier particles of dust and dirt, and provided with an outlet.

4. In a grain cleaner and drier, the combination of casing F, hopper A, shaft D, provided with cone C, and with Archimedean screw B for feeding material to the cone, suction-fan K, passage J, connecting the casing with fan K, dead-air chamber G, provided with an outlet, nozzles I, adapted to discharge steam into or upon the grain, and disk M, placed upon the shaft D and partially closing the rear end of the cone, as set forth.

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

JOHN RITCHIE.

Witnesses:

WM. P. THOMPSON,  
I. OWDEN O'BRIEN.