2 Sheets--Sheet 1.

M. H. STEELE.

Apparatus for Steaming Grain.

No. 163,340. Patented May 18, 1875.

FIG. 1.

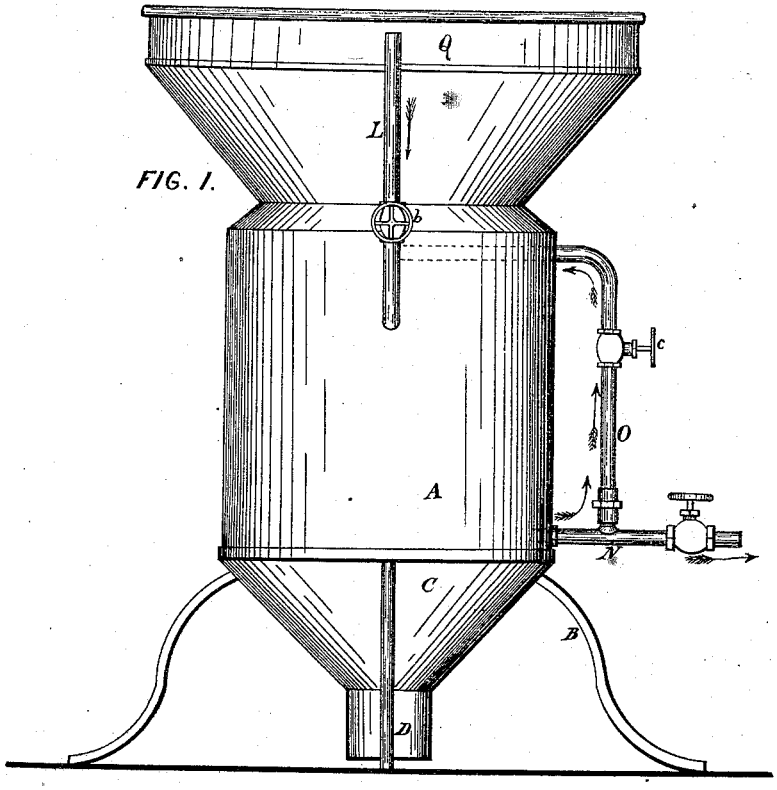
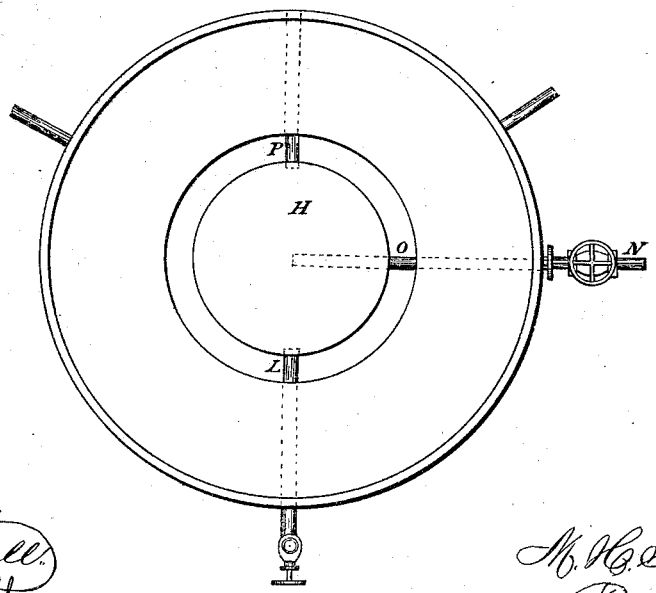


FIG. 2.



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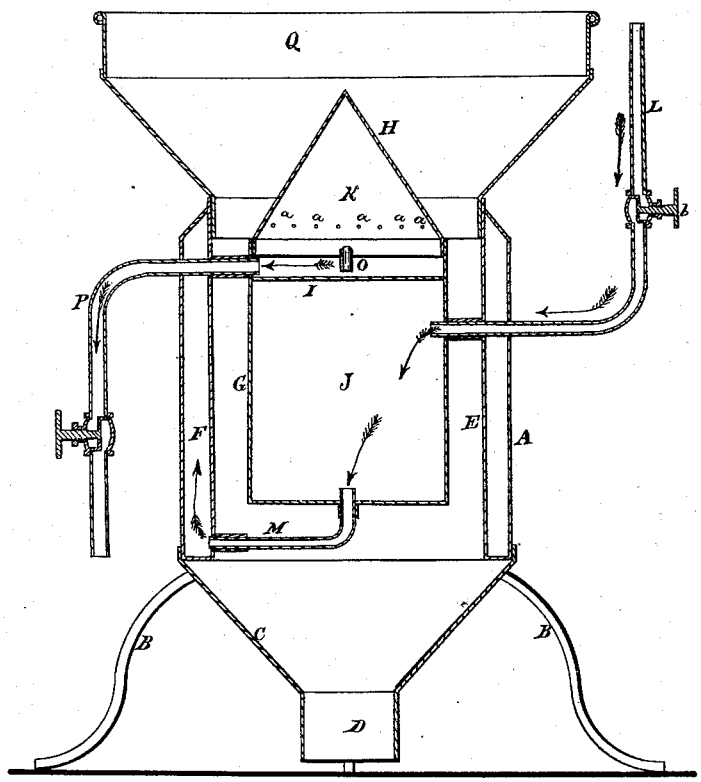
2 Sheets--Sheet 2.

M. H. STEELE.

Apparatus for Steaming Grain.

No. 163,340. Patented May 18, 1875.

FIG. B.



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UNITED STATES PATENT OFFICE.

MICHAEL H. STEELE, OF CLEVELAND, OHIO.

IMPROVEMENT IN APPARATUS FOR STEAMING GRAIN.

Specification forming part of Letters Patent No. **163,340**, dated May 18, 1875; application filed March 25, 1875.

To all whom it may concern:

Be it known that I, MICHAEL H. STEELE, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and Improved Wheat Steamer and Drier Combined, of which the following is a full, clear, and complete description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a side view of the apparatus. Fig. 2 is a plan view. Fig. 3 is a vertical section.

Like letters of reference refer to like parts in the several views.

This invention is an apparatus for steaming and drying wheat, and to soften the same preparatory to being ground.

Of the construction and operation of the apparatus the following is a full and complete description:

In the drawings, A represents a cylindrical case, mounted upon legs B, and provided with a conical-shaped bottom, C, terminating in a tubular mouth, D. The wall of the cylinder is hollow, so made by an inner wall, E, Fig. 3, whereby is formed an annular chamber, F, between the two walls. Said chamber is closed at the top and bottom, and steam-tight, whereas the bore of the cylinder is in open communication with the bottom C. Within the cylinder A is arranged a cylinder, G, furnished with a conical cap, H, fitting steam-tight. I is a diaphragm, whereby said cylinder G is divided into two chambers, J and K. The two chambers have no direct communication with each other, but are made to communicate by an arrangement of pipes, thus: The pipes L, leading from the steam-boiler, pass through the annular chamber F and open into the chamber J. Said chamber J communicates with the annular chamber by means of the pipe M, Fig. 3. The annular chamber and chamber K are related by the pipes N and O, Fig. 1. The pipe N terminates in the annular chamber, whereas the pipe O, connected therewith, passes through the annular chamber and terminates in the chamber K, as will be seen at O, Fig. 3. The chamber K opens to the outside of the apparatus by means of the waste or eduction pipe P. The several pipes are alike furnished with stop-cocks or valves for regulating the passage of steam into and through the apparatus.

Having described the construction and arrangement of the device, the practical operation of the same is substantially as follows: The apparatus is adjusted and supported by any suitable means over the millstones, and in such relation thereto that the lower end D meets the eye of the stone, while the upper end or hopper Q receives the grain-spout. Before using the apparatus it is heated up by the admission of steam thereto through the pipe L, which, as before said, connects with the steam-boiler, or so arranged as to receive the exhaust of the engine. The steam passes at once through the pipe into the chamber J, thence into the annular chamber F through the pipe M. From the annular chamber it passes into the chamber K by the pipes N and O, from which it escapes, if so desired, to the outside through the exhaust-pipe P, as indicated by the arrows. The apparatus being thus heated up, the grain is admitted and allowed to pass through it to the millstones by falling upon the conical cap H, and passing down between the cylinders G and A into the bottom C to the stones. As the grain falls upon the cap it becomes heated and moistened by the steam issuing from the chamber K through the perforations *a*, the degree of heat and the amount of moisture being regulated by the stop-cocks *b*, as the condition of the grain may require. If the wheat be very hard more steam is let into the chamber. If the grinding be too soft in consequence of damp wheat, the steam can be shut off from the chamber K by the stop-cock *c*, while the heat of the cylinders G and A will dry the grain as it passes between them. The surplus steam may be allowed to escape through the pipe N, the cock of which should be left at all times partially open to permit the escape of condensed steam. By this device the wheat, when either too hard and brittle or too soft, can be tempered to a suitable condition for being ground.

In this class of grain-steamers the steam is usually admitted at the top of the apparatus, and directly allowed to mingle with the grain. This is objectionable, for the steam is too hot for some conditions of the wheat, and its effect upon it is injurious by heating too much, so

that the flour made therefrom is yellow, and sometimes sticky and heavy, instead of being light and lively, as good flour should be. This effect of the steam cannot be avoided by the ordinary wheat-steamer in use by using less steam, for if a less amount of steam is admitted to the grain the grain becomes unequally steamed, as the volume of steam mingled with the grain is not sufficient to steam the whole mass, in which event the steam becomes wholly condensed, wetting a part of the grain, while the rest remains dry and hard, whereas if a larger amount of steam of a lower temperature could be used all the grain would be steamed equally alike without the condensation of the steam. For this there is no provision in the ordinary steamer.

To meet this deficiency, and thereby avoid the above-specified objection, is the purpose of my invention, and which I accomplish by the use of steam at a reduced temperature by allowing it to enter the apparatus below the diaphragm I and conducting it into the chamber J, thence, through the pipe M, into the annular chamber F, from which it passes, through the pipes N O, into the distributing-chamber K. By this means the steam has acquired about the right degree of temperature to be admitted to the grain from the chamber K.

It will be seen that the steam is first used for heating the cylinders G and A before admitted into the distributing-chamber K to be used upon the grain. In this way of utilizing the spent steam after it has passed through the chambers J and F into the distributing-chamber K, I am enabled to graduate its temperature according to the condition of the wheat, and, by means of the stop-cock *c* of the pipe O, whereby steam is admitted to the chamber K, shut it off therefrom and use the steam only in the chambers J and F, and exhaust the same through the pipe N without steaming the wheat at all.

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

1. The induction-pipe L, pipe M, pipes N and O, and eduction-pipe P, arranged in relation to, and in combination with, the chamber J, annular chamber F, and distributing-chamber K, in the manner substantially as described, and for the purpose set forth.

2. The chambers J, F, and K, as arranged in relation to each other, and in combination with the pipes N O, provided with a stop-cock, *c*, for admitting spent steam to the wheat and shutting it off therefrom, as the condition of the wheat may require, in the manner substantially as described, and for the purpose set forth.

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