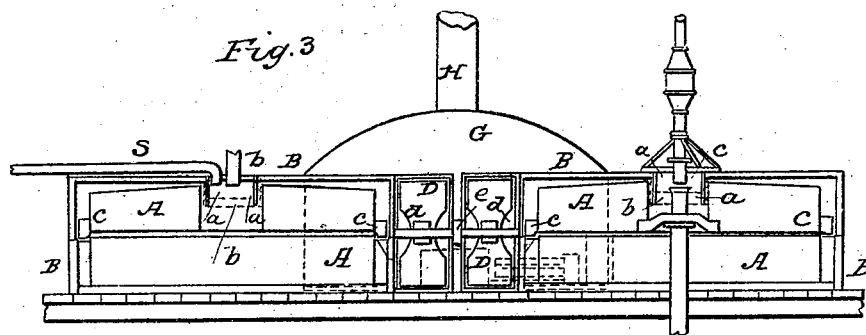
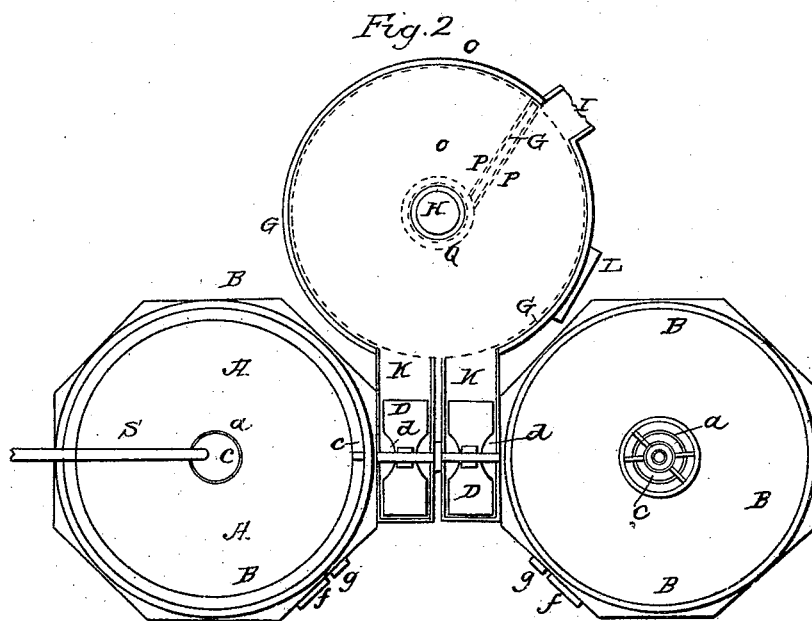
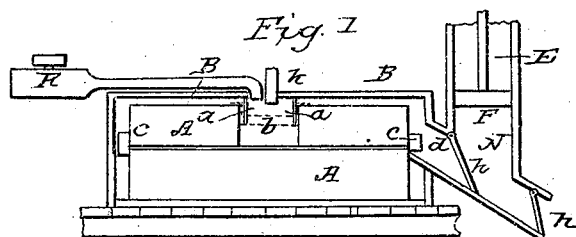


# GENDEBIEN & HOUYET.

## Millstone Exhaust.

No. 4,920.

Patented Jan'y 5, 1847.



WITNESSES  
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# UNITED STATES PATENT OFFICE.

J. B. GENDEBIEN AND A. HOUYET, OF BRUSSELS, BELGIUM, ASSIGNORS TO J. B. HYDE,  
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## FLOURING-MILL.

Specification of Letters Patent No. 4,920, dated January 5, 1847.

*To all whom it may concern:*

Be it known that we, JEAN BAPTISTE GENDEBIEN and AUGUSTE HOUYET, residing in Brussels, in the Kingdom of Belgium, have  
5 invented new and useful Improvements in Mills for Grinding Grain and other Substances and Drying or Curing Flour or Meal, and that the following is a full, clear, and exact description of the principle or  
10 character which distinguishes them from all other things before known and of the manner of making, constructing, and using the same, reference being had to the annexed drawings, making part of this specification.

15 By the ordinary process of grinding the grain in its course between the crushing surfaces meets with masses of the pulverized material which collect and are fixed in their position until crowded away by a greater  
20 accumulation than the action of the mill allows, thus the grinding surface is always much reduced, besides the flour is thereby reground and this excess of friction causes heat and injury to the product; the object  
25 of our invention is to avoid these difficulties.

The nature of our invention consists in passing a current of air, by a forcing or exhausting blower or air pump, between the  
30 two mill stones from the eye toward, and out at the periphery for the purpose of driving out the flour or meal with more rapidity than by the action of the stones aided by any current of air which may be  
35 produced by the rotation of the runner or wings, or other like devices, attached to it and carried by it, the current of air thus introduced and passing through in the direction of the radii, preventing the accumulation of flour or meal between the stones  
40 which not only retards the operation of grinding by occupying so much of the surface of the stones, but which tends by the continued friction on it to over heat and burn the flour. The effect of the current of  
45 air it also to keep the flour or meal at the required temperature to evaporate and carry off any moisture which may be contained, and by the introduction of air heated to the required temperature, to cure the flour or  
50 meal more effectually than by the kiln drying process.

Currents of air have heretofore been introduced between the mill stones by carrying them through tubes embedded in  
grooves in the bed stone and provided with 55 apertures opening into some of the furrows and also through holes in the stones; but it will be obvious that these introduce the air between the eye and the periphery and do not give the direction to the current that  
60 will produce the effect contemplated and produced by ours, viz, that of forcing the flour or meal out exclusively at the periphery, for the currents introduced by these  
65 modes will tend to force the flour or meal out through the eye of the runner, as well as out at the periphery, as the only action to resist this tendency is the centrifugal force with which the runner acts on the air.  
70 But by our method the current is forced to pass between the stones from the eye to the periphery, and in its passage must tend to carry with it the flour or meal, and at the same time cool and dry or cure it, for even  
75 when the hot blast is used as a substitute for kiln drying the grain, the continual passage of the air it will prevent heat beyond a given temperature.

Figure 1, in the drawing (annexed) represents the sectional elevation of an ordinary grain mill with the two separate adaptations of blowing and exhaustion. On the right is seen in section one of a pair of air pumps, the other supposed to stand behind the one shown, on the left is a blower and  
85 tube for forcing in the air. Fig. 2, represents the plan of two pair of grain mills with rotary ventilators and the receptacle into which the pulverized material is blown, the mill in the drawing and the ventilators  
90 as well as the receptacle, are shown in section, the former has a tube for conveying the heated air with the opening closed. Fig. 3 represents the same in elevation, with the two arrangements same as above.  
95

The letters refer to similar parts in each of the figures.

A, A, A, are the mill stones as ordinarily placed. B B B the curb and covering to same. C, the eye or hole through the middle of the  
100 revolving stone. D, the blowers fans or ventilators. E, section of an air pump. F

piston and rod to same. G, G, curb or sides to the receptacle. H, conduit for the escape of the air. I conduit for the escape of the product from the receiver. K, space in the blower boxes communicating with the receiver. L slide opening into the receiver. N, space in the bottom of the air pump. O, a revolving bottom to the receiver.

a, a, is a cylinder of leather or other material secured at its upper end to the top covering to mill. b, b, cylinder of tin or other material secured to the revolving stone and passing below the cylinder a, a, and up on the inside as shown by red lines in the drawing. These two cylinders should be as close together as possible and not touch, as they are to impede the passage of the air over the top of the revolving stone, and to cause it to flow between them to the receiver. c, c, pieces of wood or other substance fixed on opposite sides of the revolving stone to prevent the product from lodging on the sides and to carry it thus to the outlet more freely. d, d, opening or outlet between the mill and the pumps or ventilators through which the product flows with the current of air. e, pulley for driving the blower. f slide in the mill curb. g, a smaller slide at the bottom of same, to enable the attendant to examine the product, the larger opening f, being at the top of the curb is to permit a free inlet of air when g, is opened, otherwise the product will flow by with too great rapidity. These two ports should be opened simultaneously and closed again as soon as possible. h, h, valves attached to air pump. i, i, a flat piece of wood or other substance placed between the guide plates P, P, so as to move up and down freely and resting on the revolving pin o, by which means the product is conveyed to the outlet I. R, blower and tube for forcing in the air. s hot air tube, k, cover to C.

It will appear obvious for the more perfectly effecting the object desired that the air should only be permitted to enter at C, hence as there is either a tendency to a state of *vacuo* or a pressure of air within the mill, every part should be as air tight as possible therefore the joints between the blowers and the curb, as well as the bottom of the curb should be quite tight or covered with stout canvas or other flexible material glued to the joint. This is readily raised and readjusted in dismounting and setting up the mill. For the same reason the joint at a, f, and g, should be as close as possible.

The two air pumps are made round or square of wood or other material and have distinct connections with the mill as well as distinct valves, but beyond the lower valve the conduits unite and have a common outlet and the pumps are reciprocating; a blower may be placed below the floor, connected with a trough to the mill and another

to the outlet for a bag or otherwise. In the operation of the pumps Fig. 1 it will be seen that as the piston ascends the air is drawn through the opening at C, and between the grinding surfaces, opening the upper valve and keeping the lower valve closed, and as the piston descends the upper valve is closed and the lower one opened, at the same time the product which has been drawn or fallen into the space N is forced through into the receptacle below the lower valve. And in the operation of the blower, Figs. 2 and 3 the air is in like manner drawn through, or more properly the *vacuo* induces the air to rush in at C by atmospheric pressure, passing between the grinding surfaces through the openings at d, d, into the ventilators, the product of the mill flowing with the air through the ventilators into the receptacle by the outlet K, depositing it upon the bottom of the receptacle, while the compressed air passes off through the conduit H carrying with it the disengaged moisture and heat. Independent pulleys may be used for the blower in most cases to advantage, as where the two mills are not always worked simultaneously. The capacity of the pumps or the ventilators may be regulated according to the capacity of the mill, or number of mills. In the blower R, Fig. 1, a similar effect is produced by forcing the air.

A mill worked by this system turns with greater facility than without and the product is considerably augmented. The current of air acts upon all parts of the curb at the same time, the interior air entering at C with considerable force, it establishes a free current which greatly facilitates the flow of the product as soon as ground from between the grinding surfaces, while it escapes as dust and dry, the particles being separated and diffused amid the air which impels them, thus obviating a most pernicious evil attendant upon the grinding of grain by the ordinary methods.

We do not confine ourselves to the application of our invention to mills for grinding grain, as there are many materials, earth, dross, etc., which in being ground it will be found advantageous to use our application, and in many cases it will be of great advantage to heat the air (by any convenient means) before it passes through the mill, the latter case being particularly recommended in grinding Indian corn intended for long voyages.

We wish it to be understood that we do not confine ourselves to the particular arrangement laid down in the drawing, nor to the position or form of the invention as there represented, but

We claim as our invention—

1. The causing of a current of air to pass between the mill stones from the eye toward and out at the periphery, substantially for

and in the manner described, the said current being produced by a blower or any other convenient mode either by drawing the same from the mill or forcing it through  
5 as fully described above.

2. And we also claim drying or curing the flour or meal while under the action of

the mill stones by the introduction of a blast of heated air, substantially as described.

J. BTE. GENDEBIEN.

A. HOUYET.

Witnesses:

A. STOELEK,

THOS. G. ALEMSON.