(No Model.)

# E. H. SAWIN.

## MACHINE FOR DRYING, STEAMING, AND COOLING GRAIN.

No. 305,244. Patented Sept. 16, 1884.

*Fig. 1.*

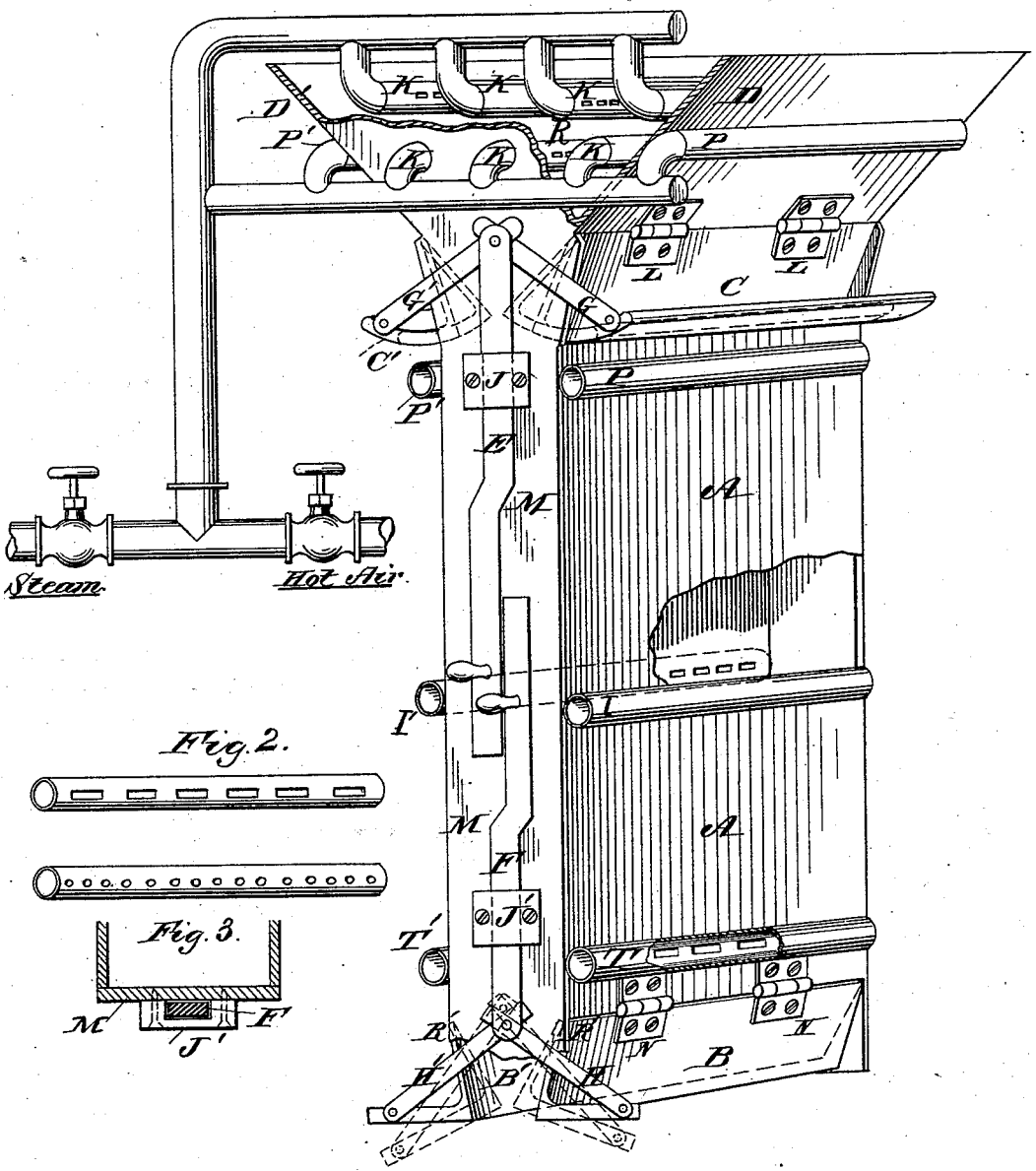


*Fig. 2.*



*Fig. 3.*




Witnesses:

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# UNITED STATES PATENT OFFICE.

EDWARD H. SAWIN, OF GARDNER, MASSACHUSETTS.

## MACHINE FOR DRYING, STEAMING, AND COOLING GRAIN.

SPECIFICATION forming part of Letters Patent No. 305,244, dated September 16, 1884.

Application filed December 15, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD H. SAWIN, a citizen of the United States, residing at Gardner, in the county of Worcester and State of Massachusetts, have invented a new and useful Machine for Steaming, Drying, and Cooling Grain, of which the following is a specification.

The object of my invention is to improve grain which has been damaged by heating, must, mold, damp, or from any other cause, by subjecting it to the action of hot air and steam, used separately or in connection, as may be desired.

For purposes of explanation, the accompanying drawings represent a machine having rectangular sides; but it may be constructed in any desired shape.

Figure 1 is a detailed view, in perspective, of the entire machine. Fig. 2 shows the perforations in the pipes. Fig. 3 is a sectional view of one of the guide-pieces which hold the rods moving the valves.

Similar letters refer to similar parts in the several views.

D D′ are sides of the upper part of the machine, more or less hopper-shaped, and A and M are also sides of the machine. The side M is broken away at the dotted line R, so as to show the interior of the upper part, and also at R′, to show the lower part.

K are metal pipes, of any shape, extending from one side to the other across the hopper-shaped part of the machine, one or more of said pipes being perforated or slitted, so as to bring the hot air or steam passing through them directly in contact with the grain, and the others open only at the ends, so as to form a heated surface over which the grain passes.

P P′ are perforated or slitted pipes admitting steam or hot air to the inside of the machine, and placed across the machine and on the outside, both above and below the valve C C′.

I I′ are perforated or slitted pipes admitting steam, either ordinary or superheated, to the inside of the machine, said pipes being placed at a suitable distance below the pipes P P′ and on the outside of the machine.

T T′ are perforated or slitted pipes admitting hot or cold air to the inside of the machine, and placed below the steam-pipes I I′ and on the outside of the machine.

C C′ are parts of the upper valve or inlet, and placed, in the accompanying drawings, at the base of the hopper-shaped part of the machine. The part C is fastened to the side D by hinges L L, and C′ is similarly attached to D′.

G G′ are arms fastened to the parts of the valve C C′, and connecting them with the rod E, by which the upper valve is opened and closed, and which is held in place by the guide-piece J, fastened to the side M.

B B′ are parts of the lower valve or outlet, placed at the lower end of the machine, B being joined to the side A by hinges N N, and B′ to the side opposite A in a similar manner.

H H′ are arms fastened to the parts of the valve B B′, and connecting them with the rod F, by which the lower valve is opened and closed, and which is held in place by the guide-piece J′, fastened to the side M. Both valves, when closed, are more or less hopper-shaped and open from the middle outward. By this arrangement a better regulation of the flow of the grain is obtained, and there is less liability of clogging. I do not, however, limit myself to the exact form of valve shown in the drawings, but desire to claim any arrangement of valves placed at the upper and lower ends of the machine and operated separately or together.

The entire machine is surrounded by a tight case or jacket, (not shown in drawings,) steam or hot air being admitted between the machine and case or jacket in order to keep the outside of the machine warm.

The manner of operating my machine is as follows: The pipes K, P, P′, T, and T′ are interchangeably connected with the boiler furnishing steam, and also with the apparatus used for generating hot air, so that in the same pipes at different times steam or hot air can be used at pleasure, and in different pipes both steam and hot air can be used at the same time, if desired. The upper part of the machine is connected with the bin holding the grain. Immediately upon the reception of the grain into the upper part of the machine it is heated,

either by direct contact with hot air or steam passing through the perforated pipes K, or by passing over the heated surfaces formed by the pipes not perforated or slitted, different grains and different conditions of the same grain requiring different treatment. At the same time hot air or steam is admitted through the perforated or slitted pipes P P′, by which means every portion of the moving mass of grain is affected. The valve C C′ is then thrown open, and the grain passes down through and is met by the steam from the pipes I I′. The steam passing through the pipes I I′ may be of ordinary temperature, or may be superheated, as the condition of the grain requires. When the grain first enters the machine, it is necessary to have the lower valve, B B′, closed until the grain first entering is sufficiently steamed, and then opened, so as to let the grain down as desired, the upper valve, C C′, being more or less closed to relieve the grain in the machine from the pressure of the grain above. After the relative amount of the opening of the valves is once determined, then they can be moved together, and will therefore keep the grain in the machine a longer or shorter time, as may be desired. In some cases it may be best to have the upper valve wide open and the flow of the grain regulated entirely by the lower valve. If but a mere contact with the steam is desired, then the lower valve should be thrown wide open and the flow of the grain regulated entirely by the upper valve. After leaving the pipes I I′, the grain passes down and is subjected, if desired, to hot or cold air admitted through the pipes T T′, and is then discharged from the machine through the lower valve, B B′. These inlet and outlet valves are so connected with each other by means of the rods E and F that they can be opened and closed simultaneously or separately, and the grain made to pass through the machine with greater or less speed, thus subjecting the grain to a longer or shorter period of heating and steaming, as its condition requires.

I am aware that various alternatives are presented in what I term the "preliminary" heating or steaming of the grain when it first enters the machine; but I especially claim that by my invention, while different grains and different conditions of the same grain require different treatment—one lot requiring a simple steaming, the next a heating by hot air in direct contact, or by being passed over heated surfaces, or by both before steaming, and the next a double steaming, with or without hot air and heated surfaces—all these various and different requirements can be met in one and the same machine.

Having thus described my invention and the manner of its operation, what I desire to claim and secure by Letters Patent is—

1. The pipes K, P, and P′, interchangeably connected for the use of steam or hot air, arranged in combination with the hopper D D′, and the upright flue A M and the valve C C′, substantially as described.

2. In a machine for steaming, drying, or cooling grain, the combination of a hopper, a vertical rectangular casing, two dampers or valves—one at the top and the other at the bottom of said casing, and connections leading therefrom to a single point, whereby they may be operated simultaneously or separately to control the flow of the grain.

3. Two valves, more or less hopper-shaped, as C C′ B B′, opening from the center outward, in combination with each other and with the pipes K P P′ I I′ T T′, which convey steam and hot or cold air to the inside of the machine, the hinges L L N N, and the sides D, D′, A, and M, substantially as described.

4. The perforated or slitted steam-pipes I I′, arranged in combination with the sides A and M, and the valves C C′ and B B′, substantially as described.

5. The perforated or slitted hot and cold air pipes T T′, in combination with the sides A and M and the valve B B′, substantially as described.

6. The rods E and F, attached to the arms G G′ H H′, arranged in combination with the guide-pieces J J′, the sides A and M, the pipes P P′ T T′, and the valves C C′ B B′, substantially as described.

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Witnesses:
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