

(No Model.)

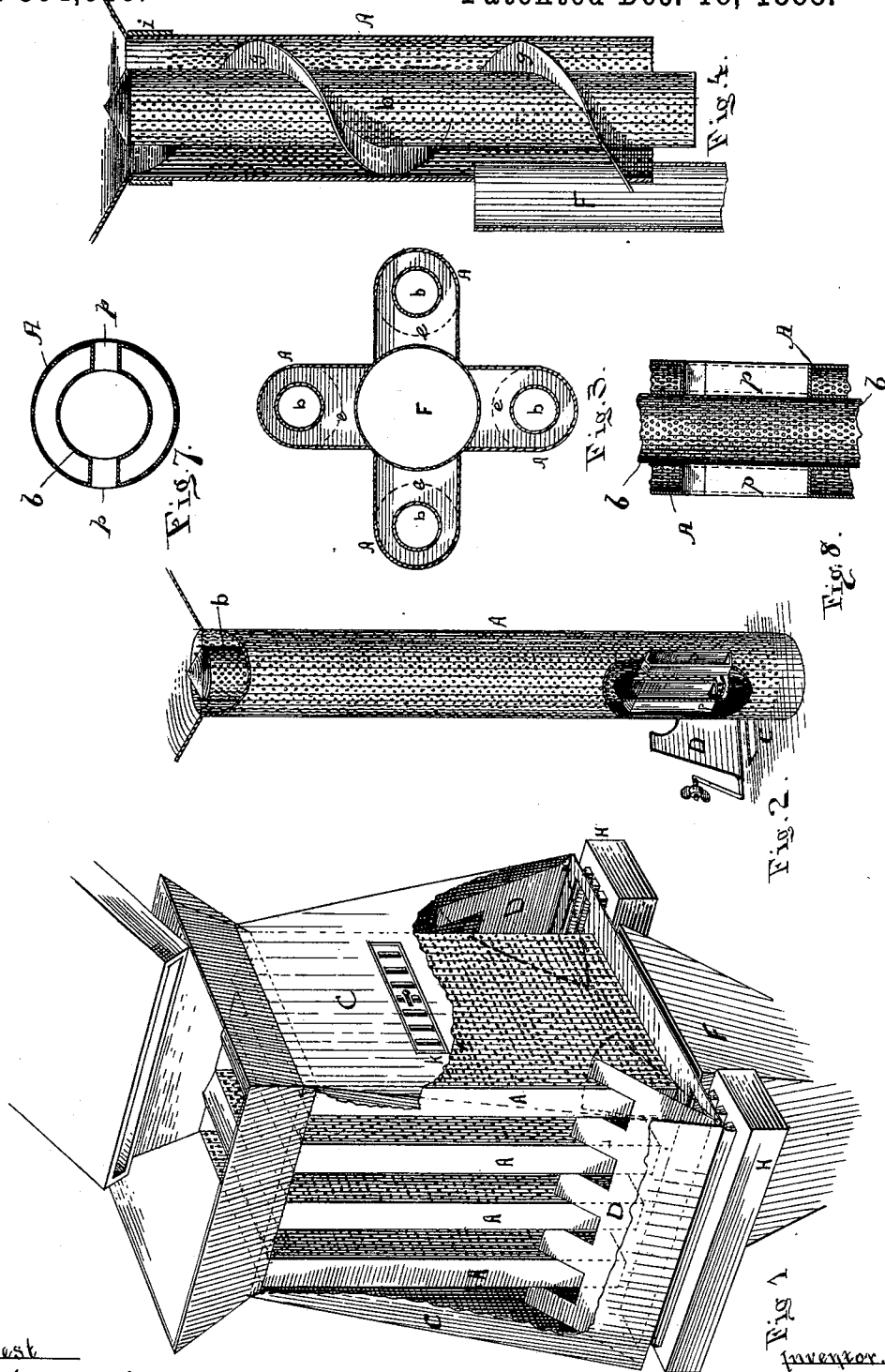
2 Sheets—Sheet 1.

W. N. SCHINDLER.

WHEAT HEATER OR TEMPERER.

No. 394,618.

Patented Dec. 18, 1888.



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R. H. Smith.
E. B. Meine

Inventor.
William N. Schindler
By his atty
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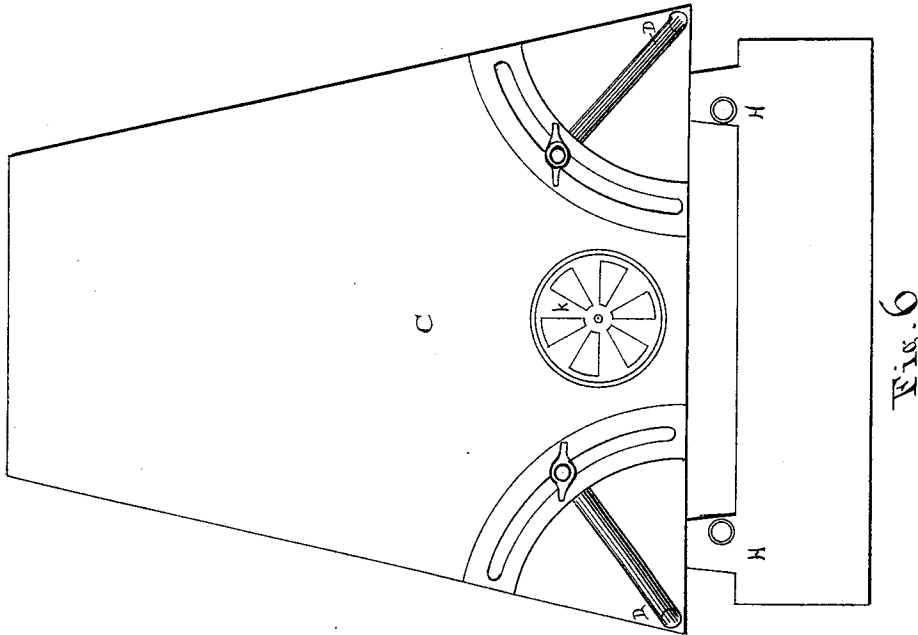


Fig. 6

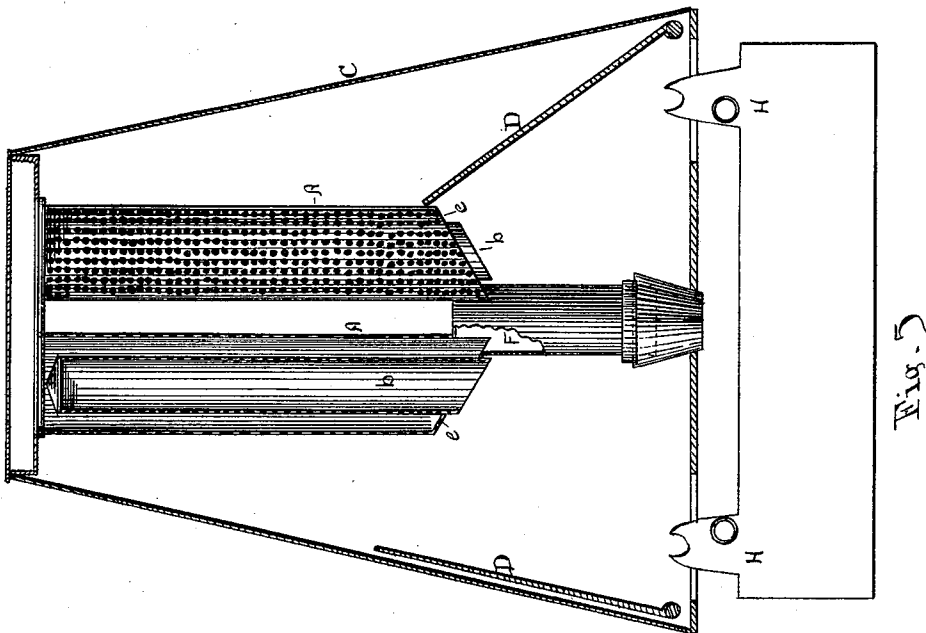


Fig. 5

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UNITED STATES PATENT OFFICE.

WILLIAM N. SCHINDLER, OF MISHAWAKA, INDIANA.

WHEAT HEATER OR TEMPERER.

SPECIFICATION forming part of Letters Patent No. 394,618, dated December 18, 1888.

Application filed April 2, 1888. Serial No. 269,358. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM N. SCHINDLER, of Mishawaka, in the county of St. Joseph and State of Indiana, have invented new and useful Improvements in Wheat Heaters or Temperers; and I do hereby declare that the following is a full and accurate description of the same.

The modern practice of milling wheat seeks to crush the berry and separate the starch portion into its natural granules without breaking them down into impalpable powder and to flatten out the outer coats into flakes without tearing them into fine shreds as was done between the burr-stones. This process requires for its success that the interior starchy portion shall be dry and easily crumbled, and that the outer coat or bran shall be moist and tough, and it is evident that uniformity of product requires uniformity of conditions of the wheat at the time when it enters between the rolls. It has been observed that subjecting the wheat to heat makes the interior starchy part more friable and the outer integument more tough. Whether this effect is due to increased dryness of the starch and increased moisture of the bran, as is thought by many millers, or whether it is due to the general effect of heat to soften the cell-walls and the glutinous matter in the outer coatings is immaterial.

Many devices have been made to heat wheat for the purpose above stated, and they may, for convenience, be separated into two classes. First, those which employ steam or other hot gases which transmit the heat through the plates or walls to the wheat which passes in close proximity to said plates on the other side; second, those which pass the hot air and products of combustion from a smokeless flame into and among the mass of grain as it descends through a perforated conduit. My improvement belongs to the latter class.

I am aware that a grain-drier has been provided with radial perforated pipes placed in horizontal series one above another, and that the grain is required to pass down, finding its way among said pipes, passing over their out-sides, while the hot products of combustion from the flame of a lamp or gas-jet are required to pass into said pipes and escape through the perforations into the mass of grain

moving over them; but this differs from my invention, because the radial arrangement of the pipes causes a great obstruction to the flow of the grain with liability to clog if the grain is damp, and if dry a great amount of dust is detached.

I am also aware that a grain-drier has been constructed with concentric vertical pipes of perforated metal, the inner pipe being connected with the outer pipe by a transverse tubular brace at a distance from the lower end, through which the hot air gains admission to the inner pipe. The grain is required to pass downward through the narrow annular space between said pipes, while the hot products of combustion from a smokeless stove are required to pass through said perforations and escape by passing through the moving stream of grain. That differs from my invention, because the transverse pipe so high up is an obstruction in the grain-conduit, and because the hot products are required only to pass through the grain a very short distance—to wit, far enough to pass around the edge of a diaphragm placed in the inclosing-case.

In the accompanying drawings, Figure 1 is a perspective view, with the casing partly broken away, of one form of wheat-heater embodying my invention. Fig. 2 is a perspective view illustrating another form of wheat-conduit for my heater. Fig. 3 is a horizontal section showing a means for grouping several wheat-heating conduits. Fig. 4 is a vertical sectional view of a wheat-heating conduit for my heater provided with a spiral diaphragm and a controlling-sleeve. Fig. 5 is a vertical sectional view of a wheat-heater embodying my invention. Fig. 6 is a side view of the same. Figs. 7 and 8 are respectively horizontal and vertical sections through the ducts *p* of Fig. 2.

To insure the exposure of every kernel to the heat, the wheat is caused to flow in a very thin stream, confined on both sides, so that whether moving at one speed or another the stream shall be uniform in thickness. To economize space, this thin stream has been wrapped around a tube—*i. e.*, caused to pass down the annular space between concentric tubes differing in diameter; but this is not a necessity.

A is a tube of perforated sheet metal, and

may be rectangular or curved in cross-section. If curved, one side of said tube is constituted by A and the opposite side by a smaller curved plate or tube, b. If rectangular, the two sides are of equal dimensions. The distance between the opposite walls in the shorter dimension is half an inch or thereabout. The width of the tube in the larger dimension may be as desired. This narrow grain-conduit is open at the top to the bin or reservoir which is to contain the grain, and at bottom it discharges into a conduit which may conduct it directly into the milling-machine. Several of these conduits may be assembled in one inclosing-case, C, which may be also of metal not perforated, and said inclosing-case is provided at its bottom with one or more lamps, H, producing smokeless flames, whereby the air within said case is heated and the hot products of combustion caused to pass up around and into the grain-conduits, and finally escape through said conduits at the top.

Dampers D, hinged to the sides of the case C, may be moved to any desired angle as to the conduit A, to deflect the hot air toward one side of the inclosure or the other, as may be desired. It will be evident that when several of said conduits are assembled in one inclosing-case they may, if desired, take wheat from several separate bins, or may deliver to separate milling-machines, and that, if desired, a portion of said conduits may be used and others unused. It will also be evident that by regulating said lamps or by using a greater or less number the quantity of heat may be varied to suit the quantity or condition of the grain. This is a matter for the judgment and discretion of the miller.

In Fig. 1 I have shown the conduits in the form of flat rectangular tubes, several of said tubes being placed parallel with each other in the inclosing-case C, and the dampers cut with projecting fingers to close in between said tubes, when desired.

In Fig. 2 I have shown the conduits between concentric tubes of perforated metal. The innermost of said tubes is connected at its bottom with the hot-air space or chamber within said case C by means of a thin flat pipe, p, placed transversely across the space which separates said inner and outer tubes, by means of which the hot air has free access to the interior of the inner pipe, whence it passes through the perforations into the stream of grain passing down between the concentric pipes. The outermost of said tubes discharges freely downward through the bottom of said case C.

In Figs. 3 and 5 several of said conduit-pipes A are shown discharging sideways into a discharge-pipe, F, common to them all, the lower end of the inner pipe, b, being freely open in the hot-air chamber and the outer pipe being closed at bottom by an inclined plate, e.

In Fig. 4 the annulus-conduit is shown with a spiral diaphragm, g, whereby the wheat is compelled to pass spirally around the inner tube, and its flow thereby be regulated and the exposure to the heat be more uniform. These are modifications of the same plan to expose the descending wheat to the hot air in a confined chamber, the only escape for the hot products of combustion being upward through the descending stream and out through opening by which said wheat enters.

It may sometimes be desirable to prolong the passage of the hot products through the wheat-conduit at the top; and I therefore sometimes make the top portion of the pipe A imperforate, and place around that portion a movable sleeve, i, which may be slipped down to cover a portion of the perforations, and thereby in effect cause the imperforate portion to be variable as to length.

I find it desirable to regulate the draft to the lamp-flame, and thereby regulate the heat evolved to a certain degree without changing the wicks; and I therefore provide a registering damper, k, in the wall of the case C. The utility of this register is found when from any cause the wheat moves into the upper end of the tube more compactly than usual, and therefore reduces the draft through it. This may be the case when the wheat is damp. By opening said damper part of the air which passes the flame is allowed to escape by that way, and the heat may be increased in that way because of the increased draft of air.

Having described my invention, I claim—

1. In a wheat heater or temperer, the thin-walled grain-conduits A of perforated metal arranged within an inclosing-case, C, singly or in group, as set forth, and the smokeless heater lamps or stoves at the bottom, combined with the hinged dampers D, adapted to close between said conduits, as set forth.

2. In a grain heater or temperer, the grain-conduits A, open at the top, the inclosing-case C, closed at the top, and the smokeless lamps or stoves H, combined with the register outlet or damper k in said inclosing-case, whereby the quantity of air passing through said lamp or stove and through the grain may be regulated, as set forth.

3. In a wheat-heater, the combination, with the inclosing-case and air-chamber C, the heating-lamp, and the perforated pipes A b, one within the other, the former being open and the latter closed at the top, of the duct p, leading from said chamber through the pipe A and the grain-space to give a free passage of air from said chamber to the inner pipe, b, substantially as set forth.

WM. N. SCHINDLER.

Witnesses:

J. W. KUHN,

D. L. P. CLEM.