No. 700,842. Patented May 27, 1902.

H. SMITH.

PNEUMATIC MALTING DRUM.

(Application filed Dec. 24, 1900.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 2.

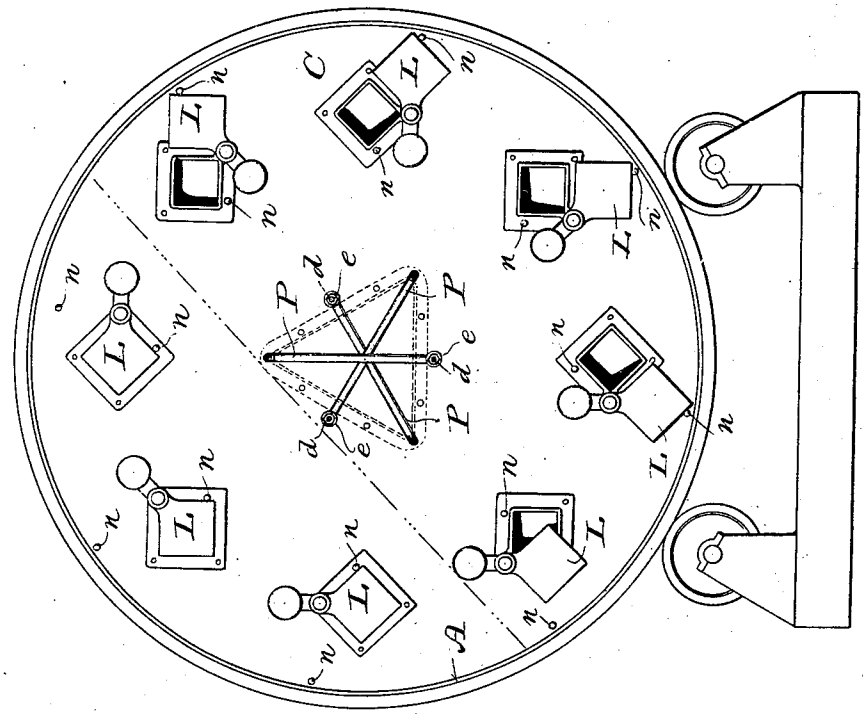
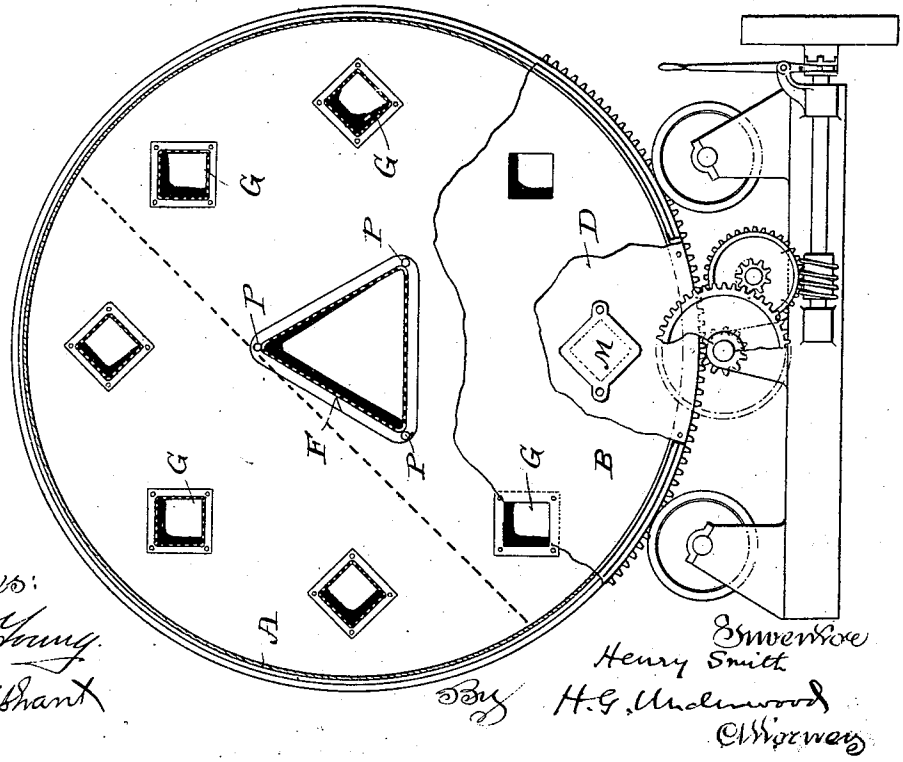


Fig. 1.



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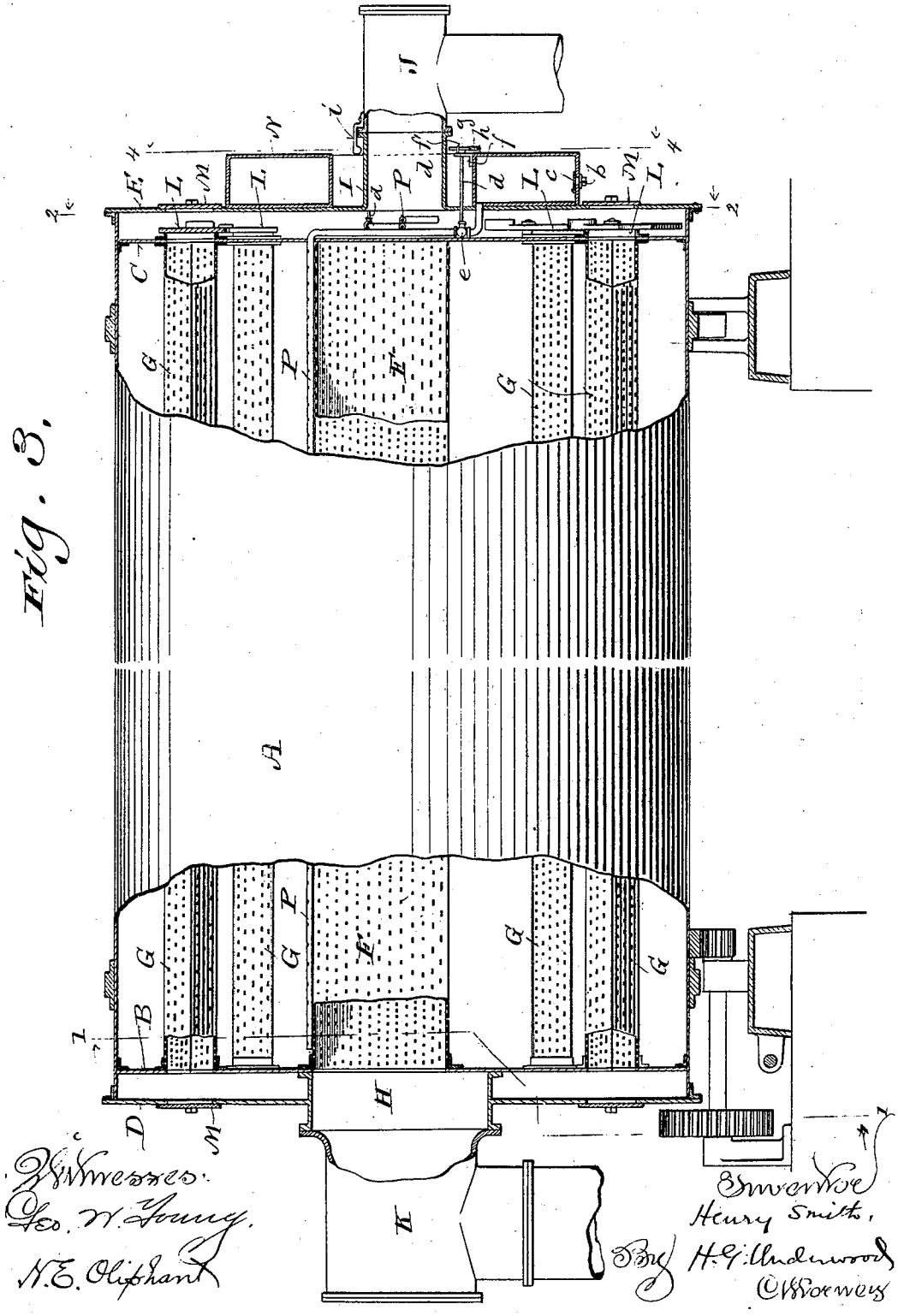
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Fig. 3.



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Fig. 5.

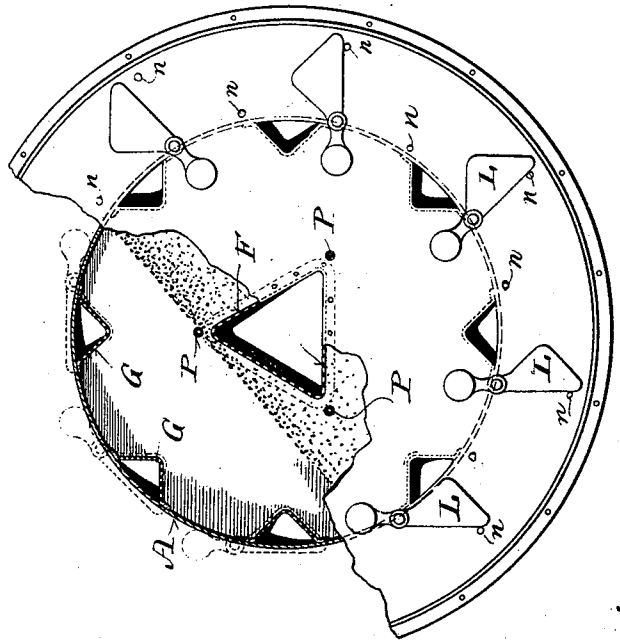


Fig. 6.

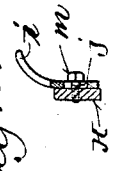
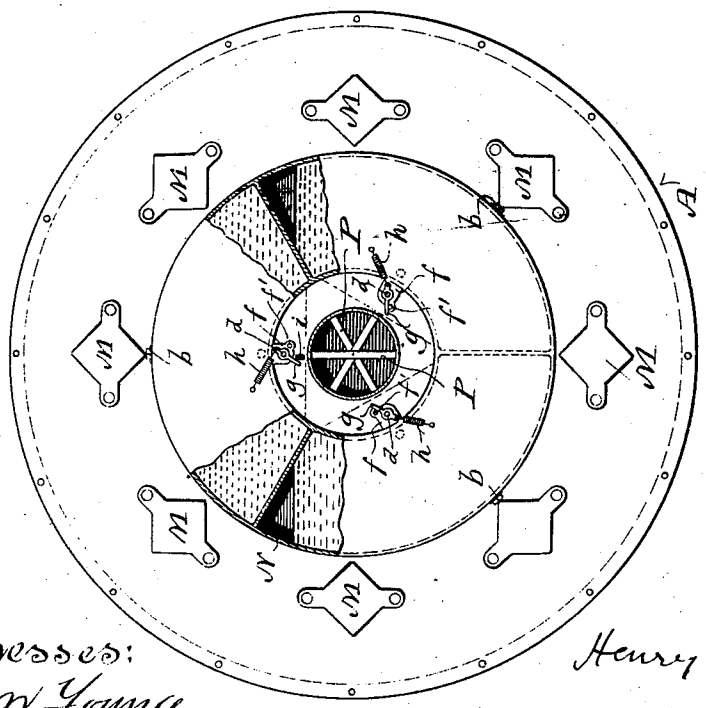


Fig. 4.



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Fig. 8.

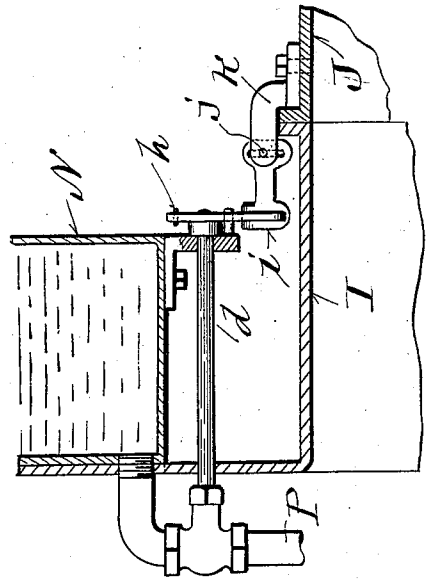


Fig. 9.

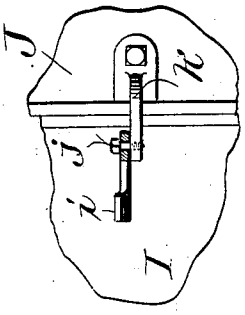
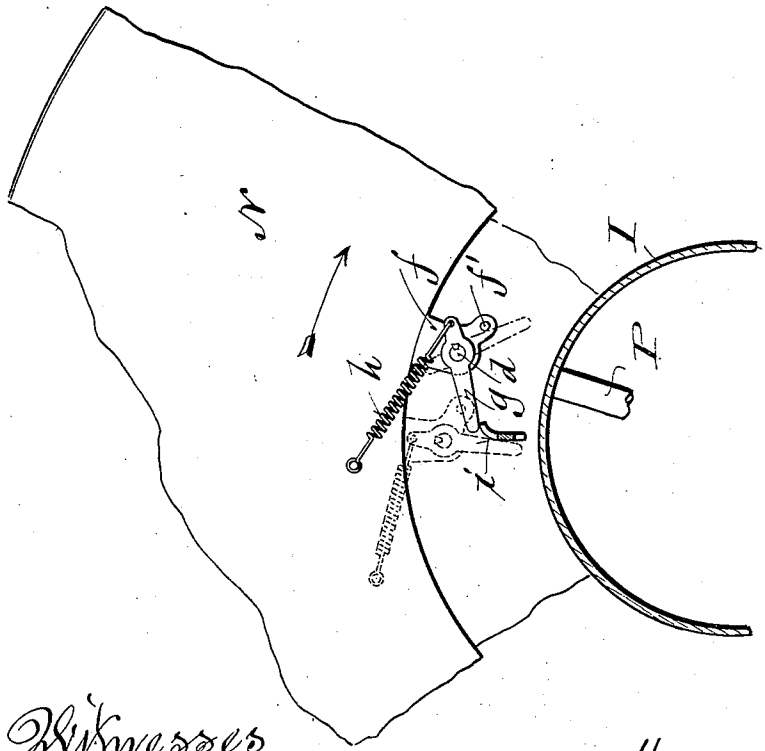


Fig. 7.



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UNITED STATES PATENT OFFICE.

HENRY SMITH, OF MILWAUKEE, WISCONSIN.

PNEUMATIC MALTING-DRUM.

SPECIFICATION forming part of Letters Patent No. 700,842, dated May 27, 1902.

Application filed December 24, 1900. Serial No. 40,849. (No model.)

To all whom it may concern:

Be it known that I, HENRY SMITH, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Pneumatic Malting-Drums; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention has for its object to obtain uniform distribution of air through the material treated in rotatory pneumatic malting-drums as well as to provide for automatic spraying of said material with water at intervals of the germinating period, said invention consisting in certain peculiarities of construction and combination of parts hereinafter particularly set forth with reference to the accompanying drawings and subsequently claimed.

Figure 1 of the drawings represents a partly transverse sectional view of a pneumatic malting-drum embodying my improvements, this view being indicated by lines 1 1 in the third figure; Fig. 2, an elevation illustrating the interior of the front air-chamber of the drum, this view being on the plane indicated by line 2 2 in the said third figure; Fig. 3, a longitudinal elevation of said drum, partly broken and in section; Fig. 4, a rear elevation of the aforesaid drum, partly broken and in section, the plane of the view being indicated by line 4 4 in the aforesaid third figure; Fig. 5, a view similar to the second figure with parts broken and in section, this view illustrating a possible variation of air-flues and automatic gates for the same; Fig. 6, a detail elevation illustrating an adjustable striker; Fig. 7, a detail front elevation, partly in section, illustrating valve-control mechanism; Fig. 8, a detail sectional view illustrating valve-control mechanism in side elevation; and Fig. 9, a detail plan view illustrating the adjustable wiper, partly in horizontal section.

Referring by letter to the drawings, A indicates the main or material holding portion of a pneumatic malting-drum embodying my improvements, this drum being cradled on antifriction-disks and provided with a spur-gear collar in mesh with a driving-pinion, as is common in the art, said portion of the drum being also provided with the usual variety of necessary openings that are normally closed; but it has not been deemed necessary to illustrate these well-known openings and their closures.

By means of partitions B C and heads D E of the drum the latter is provided with end chambers, and connected to the partitions to register with corresponding openings therein are a series of perforated air-flues, all of which are preferably polygonal instead of cylindrical in cross-section in order to obtain the best results with respect to agitation of the material treated in said drum.

The central exhaust-air flue F is of greater area than the outher flues G, arranged at regular intervals in a circle within the drum, said central exhaust-flue being preferably triangular in cross-section, the same as has heretofore been set forth in United States Patent No. 507,536, issued to Franklin B. Giesler October 31, 1893, but closed at its front end by partition C, its rear end being open to space within an annular nozzle H, extending from partition B through the rear head D of said drum.

An outer nozzle I, central of the front drum-head E, has an end flange that abuts a corresponding flange of an air-supply flue J, and an outer end flange of rear nozzle H abuts an opposing flange of a flue K, that is connected to a suction-fan casing or a draft-stack.

In pivotal connection with forward partition C are a series of counterweighted gates L for the corresponding ends of air-flues G, and plates M constitute closures for drum-head hand-holes in line with each of these flues that are arranged at intervals of a circle. In Figs. 1, 2, and 3 the flues G are shown as square in cross-section and arranged at intervals of a circle of less diameter than the drum; but, as shown in Fig. 5, said flues may be triangular and formed in part by the body portion of the drum. However, in any arrangement the cross-sectional polygonal contour of the flues G may be as varied as practice may warrant.

In connection with the front head E of the drum is an annular water-reservoir N, divided by radial partitions into a series of compartments, each of which is provided with a plug-closed filling-aperture and valve-con-

trolled vent. If desirable, the vents may be made in the plugs for the filling-apertures and each of these apertures governed by a check-valve, an illustration of such a construction and arrangement of parts being shown in Fig. 3, wherein *b* represents a vented plug and *c* the check-valve adjacent thereto.

Leading from each compartment of the reservoir N is a pipe P, that extends along a corner of the preferably triangular exhaust-air flue F, each pipe being perforated at intervals of its length within the drum and governed by a valve, the stem *d* of which extends outward from the valve-casing *e* in the space between nozzle I and reservoir N, the outer portion of each valve-stem being supported in a bracket *f*, fast on said nozzle. Rigid with the outer end of each valve-stem is a crank *g*, opposed by a stop-lug *f'*, and, as herein shown, a conveniently-arranged spring *h* is employed in connection with each crank to resist swing of same in the direction necessary to open the corresponding valve, the operation being illustrated by dotted and full lines in Fig. 7. In the path of the cranks *g* is a wiper *i* in rigid connection with the stationary air-supply flue J aforesaid.

In detail, as best shown in Figs. 6, 8, and 9, the wiper *i* may be one end of a plate having its other end provided with a slot engaged by set-screw *j* in connection with an arm of a bracket *k*, that is made fast on air-flue J, said wiper being held in adjusted position by the set-screw. The rock of the valve-stems *d* successively against resistance of their springs *h* is accomplished by contact of cranks *g* with the stationary wiper *i*, the length of time each valve will remain open depending upon the duration of contact between its spring-controlled stem-crank and said wiper, this time being variable at will when the aforesaid wiper is adjustable, as herein shown and described.

The drum being in motion, material therein is constantly shifting, and the agitation is improved by having the several perforated air-flues of polygonal contour. As the material in less quantity than the capacity of the drum is carried by the same it will from time to time fall of its own gravity in an oblique line transversely of said drum. As explained in the aforesaid patent, the material in its fall will sometimes be parallel to and above a face of the polygonal perforated exhaust-air flue F, and at other times corners of the flue will gradually rise above said material, and some of the latter in its fall will dam up against an elevated corner to eventually fall over the same.

The counterbalanced pivotal gates L have automatic play between stops *n* to open and close the air-flues G as the drum rotates, and by reference to Fig. 2 it will be seen that a major portion of these flues are always open below the mass of material in said drum, the remainder of said flues being cut off from the air-supply. Hence it is apparent that most, if not all, of the air will be drawn upward through the material, whereby the best results are obtained, this being an important feature of my improvements. It is also to be observed that any air passing into the rear chamber of the drum will be drawn toward the exhaust through the flues that are for a time closed at one end.

At any time the moisture, with the air, is not sufficient for the germinating process in the drum the wiper *i* is set in the path of the cranks *g* of valve-stems *d*, and hence at intervals in the rotation of said drum there will be an automatic distribution of water in the same to moisten the grain, the amount of this distribution being in proportion to the time the valve-stem cranks are successively in contact with said wiper, this being another important feature of my improvements. The position of the wiper *i* is such, as shown in Fig. 4, that the water is sprayed over the germinating grain or into the mass of same, according to the stage of growth.

By having the reservoir N on drum-head E encircling the air-supply nozzle I the radiation of warmth from the air in said nozzle and adjacent front chamber of said drum will serve to properly temper the water in said reservoir before the same is needed to moisten germinating material in the aforesaid drum, this being still another important feature of my improvements.

In some instances it may be found desirable to omit the rear air-chamber of the drum, in which case the rear ends of flues G will be closed by the adjacent drum-head having the flue H central thereof.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A rotatory pneumatic malting-drum having a series of air-distributing flues arranged therein at intervals of a circle, a corresponding series of independent counterbalanced gates in pivotal connection with an air-chamber wall of the drum to severally control the inlet ends of the respective flues, and stops on said partition arranged to limit automatic play of each gate.

2. A rotatory pneumatic malting-drum having a central exhaust-air flue, a water-reservoir carried by the drum, and means for automatic distribution of the water from the reservoir to the interior of the drum at recurrent intervals.

3. A rotatory pneumatic malting-drum, having a central exhaust-air flue, a water-reservoir carried by the drum and divided by radial partitions into compartments, a perforated pipe leading from each reservoir-compartment along said flue, valve mechanism controlling the pipes, and means whereby said mechanism is automatically actuated to open and close said pipes at recurrent intervals.

4. A rotatory pneumatic malting-drum having a central exhaust-air flue, a water-reservoir carried by the drum and divided by ra-

dial partitions into compartments, a perforated valve-controlled pipe leading from each reservoir-compartment along said flue, each valve-stem being exposed and provided with a crank, a spring arranged with relation to each crank to resist swing of same in the direction necessary to unseat the corresponding valve, and a stationary wiper in the path of the valve-stem cranks to actuate the same against spring resistance.

5. A rotatory pneumatic malting-drum having a central exhaust-air flue, a water-reservoir carried by the drum and divided by radial partitions into compartments, a perforated valve-controlled pipe leading from each reservoir-compartment along said flue, each valve-stem being exposed and provided with a crank, a spring arranged with relation to each crank to resist swing of same in the direction necessary to unseat the corresponding valve, a stationary bracket, and a plate in adjustable connection with the bracket to constitute a wiper in the path of the valve-stem cranks.

6. A rotatory pneumatic malting-drum, having a central exhaust-air flue, an annular water-reservoir on a drum-head surrounding the inlet air-nozzle that projects from said head, and means for automatic distribution of the water from the reservoir to the interior of the drum at recurrent intervals.

7. A rotatory pneumatic malting-drum having a forward air-chamber a central air-exhaust flue and air-distributing flues concentric with the exhaust-flue, counterbalanced pivotal gates each arranged to control the inlet end of an air-distributing flue, a water-reservoir carried by the drum and divided by radial partitions into compartments, a perforated valve-controlled pipe leading from each drum-compartment along the air-exhaust flue, and means for automatically opening and closing the pipe-valves.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

HENRY SMITH.

Witnesses:
GRETOO AHECHER,
ALEX. BUCTTICT.