

(No Model.)

W. L. TETER.

PROCESS OF AND APPARATUS FOR CLEANING GRAIN.

No. 262,505.

Patented Aug. 8, 1882.

Fig. 1

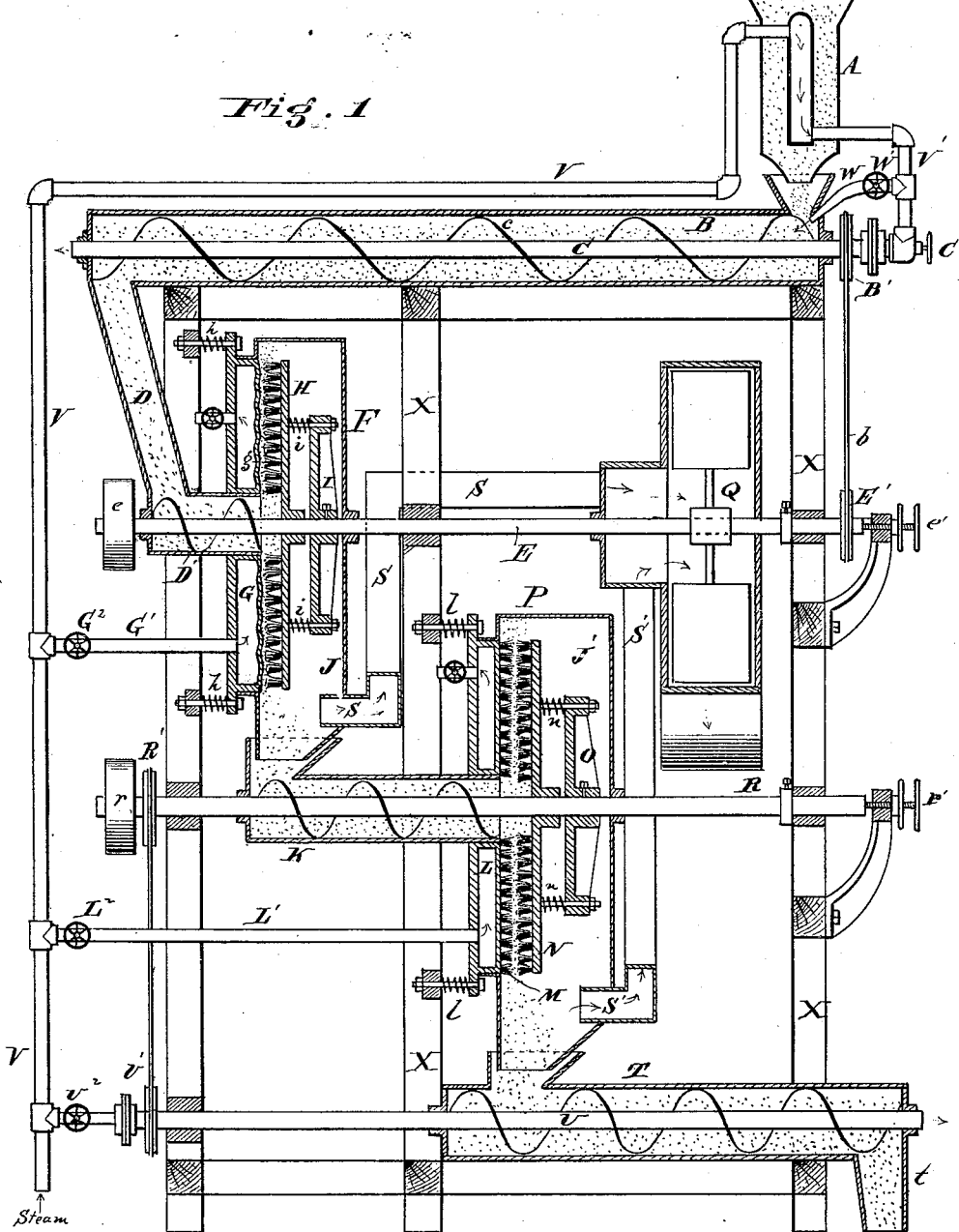
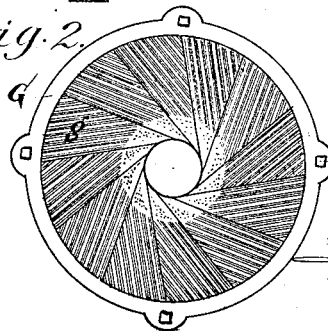


Fig. 2



Attest
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[Signature]

UNITED STATES PATENT OFFICE.

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PROCESS OF AND APPARATUS FOR CLEANING GRAIN.

SPECIFICATION forming part of Letters Patent No. 262,505, dated August 8, 1882.

Application filed December 23, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. TETER, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Processes of and Apparatus for Cleaning Grain, of which the following is a specification.

My invention has reference to processes and apparatus adapted to clean grain, but more particularly to those processes known as "decorticating processes;" and it consists in heating or steaming the grain, or both combined, and in the heated condition treating it in an attrition-machine to friction and air-currents, then to a polishing or finishing machine and air-currents, by which the outer or bran coating is removed, and after to a drier, which completely dries the cleaned or decorticated grain before passing to the burr-stones, and, finally, in the construction of said apparatus, all of which is more fully set forth in the following specification, shown in the accompanying drawings, and pointed out in the appended claims.

The object of my invention is to clean wheat and other grains by removing its outer or bran coating, thereby producing an article from which to make flour which shall retain its nitrogenous elements upon grinding it into a flour in the ordinary mill.

In the drawings, Figure 1 is a sectional elevation of my improved grain-cleaning machine, and Fig. 2 is a front view of the attrition-surface.

A is a heater.

B is a conveyer having a feeding-screw, *c*, and a hollow steam-shaft, C.

D is a chute from the conveyer to the attrition-machine F.

E is the attrition-machine shaft, and is driven by pulley *e*.

D' is a conveyer to feed the grain into the eye of the attrition-surface *g*, which is heated by steam in the box G, which is fed into it by steam-pipe G' and governed by valve G².

H is an attrition-brush.

I is a flange or disk, and is secured to shaft E. *i* are springs, which press the brush H against the attrition-surface *g*. The box G is also set on springs *h*, and carries a casing, J, adapted to surround it on all sides, also inclosing the brush H to keep the grain from scattering.

P is the finishing-machine, which consists of a box, L, for steam similar to box G, only instead of the surface *g* it is provided with brushes M. This box L is set upon springs *l*, and steam is admitted to it by steam-pipe L', and the supply is governed by valve L². The steam-pipes G' and L' may work loosely in the boxes G and L to allow the latter some slight play; or they may be rigidly secured to these boxes and provided with any well-known joint. The steam which enters the boxes G and L escapes by exhaust-pipes, (shown but not lettered,) which may discharge directly into the air or into another main, into which they open with loose joints.

The casing J is provided with an opening or spout at the bottom, which discharges into the conveyer K on shaft R, which is adapted to feed the grain into the eye of the box L. The shaft R is supported in suitable bearings, and is driven by pulley *r*. It carries secured upon it a disk, O. Fitting loosely upon the shaft R, and adapted to lateral movement, is the brush-disk N, which is pressed forward against the brushes M by the springs *n*. The casing J' is similar to casing J, and surrounds both brushes, and discharges the cleaned grain into the drying conveyer or heater T, having a steam-axle, U, to which steam is fed and governed by valve U². The cleaned and dried grain is fed by spout *t* to the burr-stones to be ground. The shafts E and R are adjusted endwise by adjusting-screws *e'* and *r'*, so as to bring the attrition or friction brushes nearer or farther from the stationary friction-surfaces.

Upon either shaft E or R is a suction-fan, Q, which sucks the removed coatings from the cleaned grain out of the casings J and J' through the tubes S and S'. The conveyer-shaft U is driven from shaft R by a band passing over pulleys R' and U', and the conveyer-shaft C is rotated by a band, *b*, passing over pulleys B' and E'. Steam is supplied to pipes U L' G', heater A, and conveyer C by pipes V and V', and the supply of steam to the upper conveyer is governed by valve C'. A steam-pipe, W, provided with a valve, W', admits steam from pipe V' to the grain in the conveyer, but is only used when there is not sufficient moisture in the grain. The boxes G and L with their casing are stationary, while the brushes H and N rotate before them.

The operation is as follows: The grain is fed in the cold state into the heater A, in which it is thoroughly heated, bringing the moisture from the inside to the surface, and thereby moistening the outer coating on said grain. It is then passed into the conveyer B, which further heats it by steam passing through the pipe or axle C. If the grain is very dry, a little steam is admitted to it by pipe W; but in practice this is very seldom used. The grain then in its heated and externally-moistened condition passes down chute D into the conveyer D', which feeds it between the attrition-surface *g* and the spring-brush H, where it undergoes a rough treatment to rub off the coatings of the grain, which have been loosened by the action of the heat on the internal moisture of the berry, and which has blistered its coating, and to still more insure their removal the attrition-surface is heated by steam in box G. The attrition-surface *g* is grooved somewhat similar to a millstone, as shown in Fig. 2, but it may be varied as desired. As the product passes down the removed coats are sucked up by tube S to fan Q, and the grain passes to conveyer K by which it is fed to the finishing-machine and passes between the two stiff brushes N and M, one only of which revolves, and after undergoing a severe brushing action is discharged into the conveyer T, which dries the grain thoroughly by steam passing through pipe or axle U before passing it to the burr-stones by spout *t*. As the grain in its cleaned condition and coatings pass down the casing J' to the conveyer T, the coatings are sucked up by the tube S' and fan Q. The finishing-machine is kept hot by the steam-box L back of the brush M.

By the foregoing construction the apparatus is made in a condensed form and adapted to treat the grain in a continuous manner.

I do not limit myself to the precise construction herein shown, as it may be varied in many ways without departing from my invention; yet I prefer this construction to all others.

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

1. The herein-described process for cleaning grain, which consists in first heating said grain without moistening it to draw the internal moisture to the surface, and then treating it to friction or attrition and air-currents to remove the outer or bran coating, and then thoroughly heating the perfectly-cleaned grain with dry heat and without air-currents, as and for the purpose specified.

2. The herein-described process for cleaning grain, which consists in the following steps, to wit: first heating the grain with dry heat, then slightly moistening it, then subjecting it to the combined action of dry heat, hard friction, and currents of air, then subjecting it to dry heat, slight friction, and air-currents, and finally heating it after it has had its outer coating entirely removed, substantially as and for the purpose specified.

3. Apparatus for cleaning grain which consists of the combination of a heater, an attrition-machine, a finishing-machine, and a suction-fan, the finishing and attrition machines being adapted to have currents of air sucked through all or part of them.

4. In apparatus for cleaning grain, the combination of heater A, conveyer B, with its steam-axle C, conveyer D', attrition-surface *g* and its steam-box G, brush H and casing J, fan Q, and pipe S, as described.

5. In apparatus for cleaning grain, the combination of heater A, conveyer B, with its steam-axle C, conveyer D', attrition-surface *g* and its steam-box G, brush H, means by which it is adapted to springing action, fan Q, casing J, pipe S, conveyer K, brushes M and N, means by which they are both adapted to springing action, casing J', pipe S', and a heater, T.

6. The combination of heater A, conveyer B, steam-pipe W, and attrition-machine F, substantially as described.

In testimony of which invention I hereunto set my hand.

WILLIAM L. TETER.

Witnesses:

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