(No Model.) 3 Sheets—Sheet 1.

W. L. TETER.

PROCESS OF AND APPARATUS FOR CLEANING GRAIN.

No. 262,504. Patented Aug. 8, 1882.

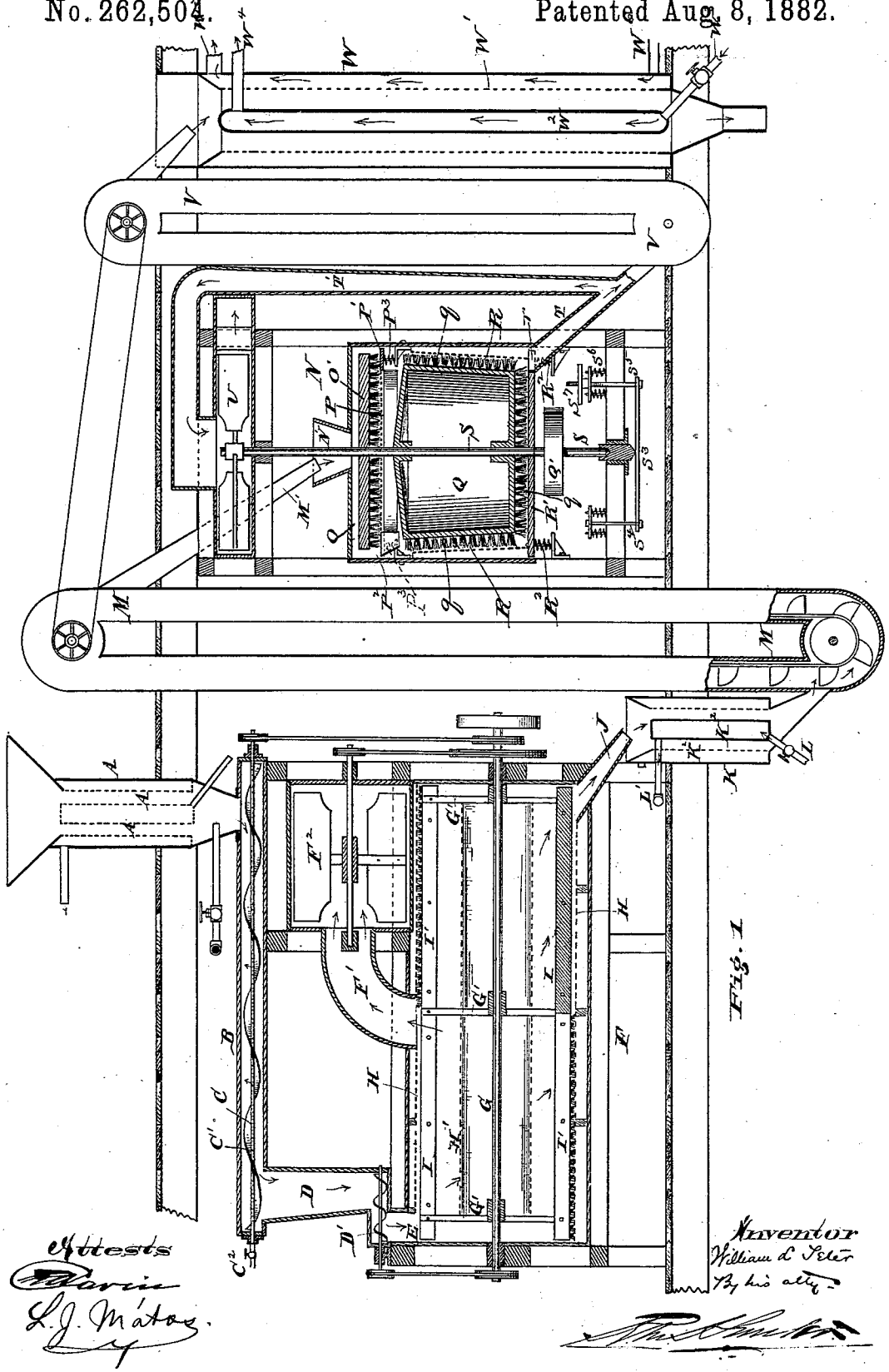


Fig. 1.

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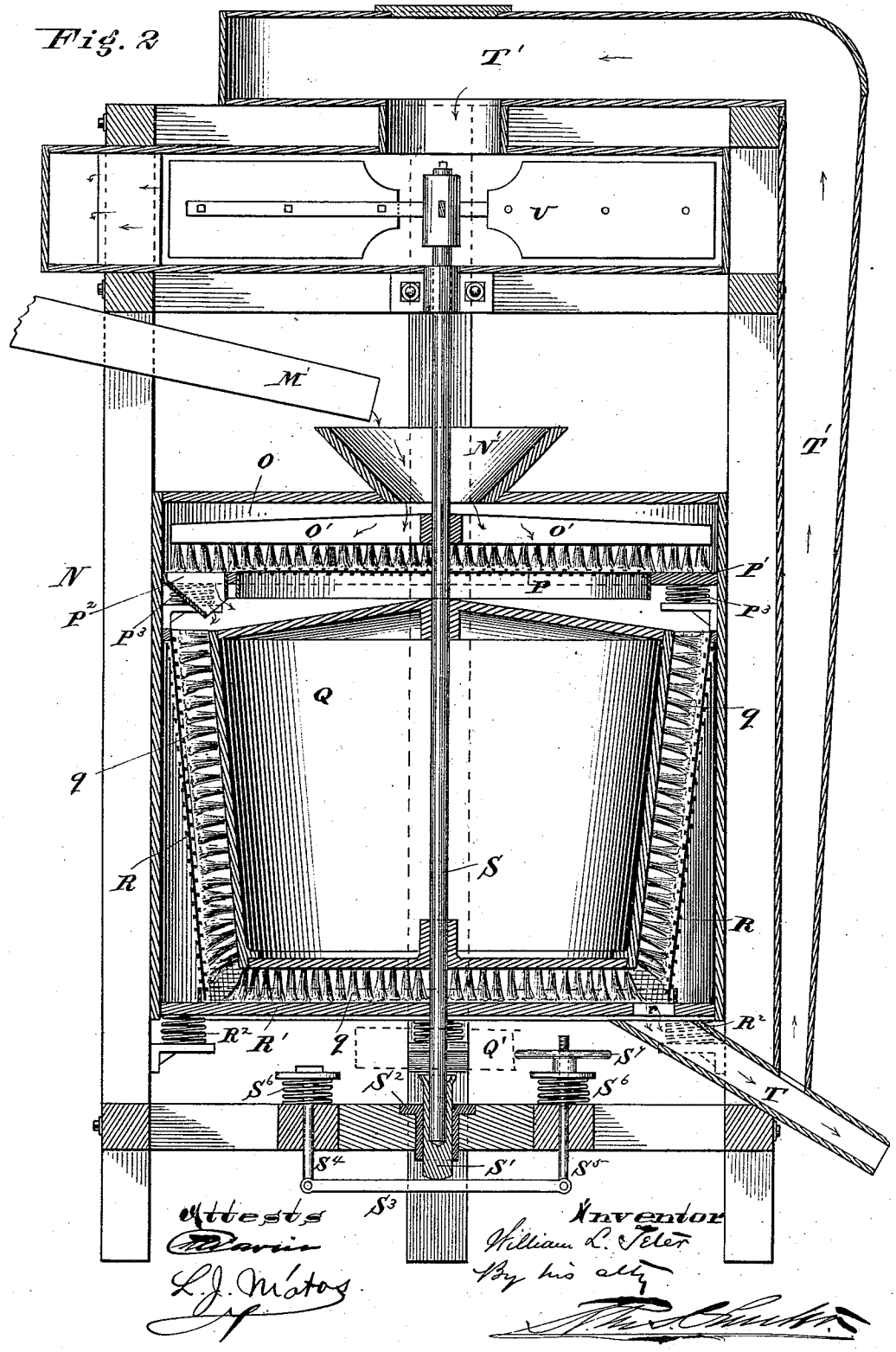
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Fig. 2



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(No Model.) 3 Sheets—Sheet 3.

W. L. TETER.

PROCESS OF AND APPARATUS FOR CLEANING GRAIN.

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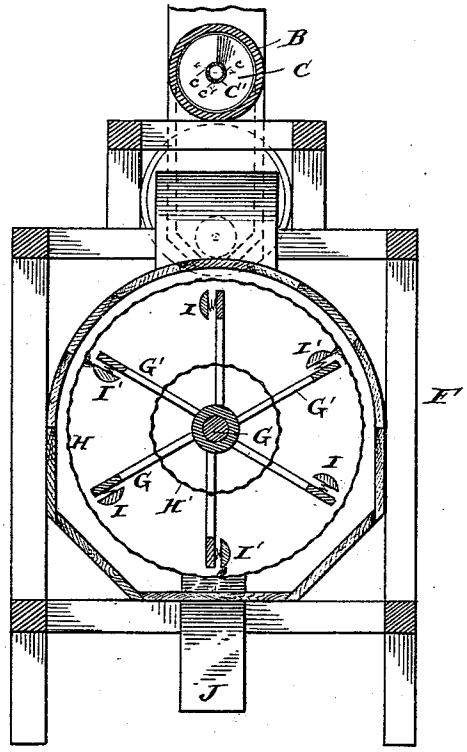


Fig. 3



Fig. 4

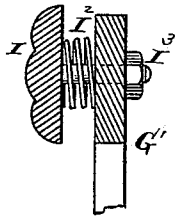


Fig. 5

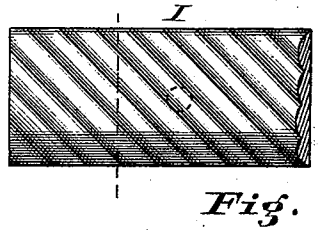


Fig. 6

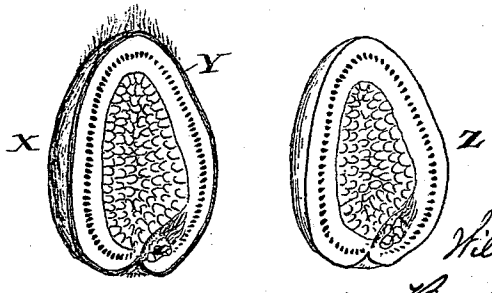


Fig. 7

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UNITED STATES PATENT OFFICE.

WILLIAM L. TETER, OF PHILADELPHIA, PA., ASSIGNOR TO THE ECLIPSE IMPROVED WHEAT CLEANING MACHINE COMPANY, OF CAMDEN, N. J.

PROCESS OF AND APPARATUS FOR CLEANING GRAIN.

SPECIFICATION forming part of Letters Patent No. 262,504, dated August 8, 1882.

Application filed October 7, 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 Improved Process of and Apparatus for Cleaning Grain, of which the following is a specification.

My invention has reference to an improved process for cleaning grain prior to its being ground, and in apparatus to accomplish said process; and it consists in improvements fully set out in the following specification, shown in the accompanying drawings, and pointed out in the claims.

In the drawings, Figure 1 is a sectional elevation of complete apparatus for carrying on my improved process. Fig. 2 is a sectional elevation of the finishing-machine. Fig. 3 is a cross-section of the steaming and friction machine used in the first part of my process. Fig. 4 is a longitudinal section of one of the friction-slats used in the said machine. Fig. 5 is a cross-section of same, showing the method of securing it to the revolving arms. Fig. 6 is a front elevation of a portion of same. Fig. 7 shows a grain of wheat in section before and after being cleaned by my improved process.

The grain to be treated is passed in the cold state into the steamer A, through which highly-heated steam is passed, heating the grain throughout. This steamer A opens into a conveyer, B, provided with a feeding-screw, C, secured to a pipe or hollow axle, C′, provided with small holes *c*, through which moist steam admitted by pipe C^2 passes into the grain being fed by the conveyer. The grain fed by the conveyer passes down a tube, D, to a second feeding-screw, D′, which feeds the steamed grain into the machine F. If desired, the screw-conveyer C may feed the grain directly into the machine F, thereby dispensing with the conveyer D′. The steamed grain passes through opening E into the wire-gauze cylinder H and upon the rotating wire-gauze cylinder H′, which rotates with the shaft G, which carries the spiders G′, upon the extremities of the arms of which are secured with springing action the friction-slats I and brushes I′, which former rotate in close proximity to the screen H and the latter continually brush it. The revolving screen-cylinder H′ is designed to impart additional attrition to the grain as it falls upon it after being carried up by the slats I and brushes I′. The construction preferred for these slats is shown in Figs. 4, 5, and 6, in which the slat I is secured to the arms G by bolts I^3, with springs I^2 between to impart a springing action thereto. The fronts of these slats are rounded, and are provided with a great number of grooved or rounded beads, as shown, to give the greatest frictional effect when passing among the grain. The suction-fan F^2 communicates with the interior of the cylinder H by tube F, through which it sucks off the loose coatings and moisture. In this attrition-machine the grain is fed in a heated condition throughout and moistened on its surface, and is here slowly dried by the exhaust-fan, and has its outer coating mostly removed. The internal heat of the berry, gradually coming to the surface, greatly aids in the removal of the outer coating. The grain, after being treated in the machine just described, passes by spout J through a heater or drier, K, in which K′ is the steam tube and K^2 is the gage-tube. L is the steam-pipe, and L′ the exhaust. The grain, after being dried in drier K, is conveyed by the elevator M or directly to the finishing-machine N. After passing into the hopper N′ from the spout M′ the grain is passed into a chamber, O, and falls upon a screen, P, having a wooden rim, P′, encircling it for the purpose of forming a rigid support for the screen upon the springs P^3, and also to insure the discharge of the grain reaching the periphery by the spout P^2. In this chamber and upon the screen P the brushes O′, secured to the shaft S, rotate. The grain fed from the chamber O falls between the inverted conical screen R and brushes *q* upon the conical hub Q. The screen R is secured at the top to the sides of the frame, and is closed at the bottom by a wooden floor, R′, set upon springs R^2 and adapted to vertical springing action. The bottom, as well as the sides, of the hub Q is provided with brushes *q*, which brush the floor R′. The cleaned grain and the coatings pass out by opening *r* into the spout T to the elevator V, to be conveyed to the drier W.

The shaft S, carrying the brushes O and hub Q, is supported in a shoe, S′, adapted to ver-

tical adjustment through the box S^2. This shoe S′ rests upon a rod or bar, S^3, supported at one end to a bolt, S^4, and on the other by a screw-bolt, S^5, both resting on springs S^6, and the latter made adjustable by a hand-wheel nut, S^7. The shaft S is driven by a belt and pulley, Q′, and rotates at the top a fan, U, which creates a suction from the spout T and machine N, carrying off the loose coatings by a pipe, T′. The tube T′ connects the suction-fan U with the discharge-spout T, communicating with the opening in the floor R of the machine N.

The drier W may be of any ordinary construction; but that shown consists of an inner steam-case, W^2, supported within a tube of wire-gauze, W′, said case W^2 being provided at the bottom with a steam-pipe, W^3, and at the top with an exhaust-pipe, W^4, and the gauze cylinder is also provided with an exhaust, W^5. A current of hot air is constantly passing up the drier through pipe W^6 and out of W^5 at the top. The cleaned grain, as it emerges from the drier, is perfectly white and entirely free from the usual brown-bran coating, and in this condition passes to the burr-stones or rolls, or is in a condition to be made into cracked wheat, &c. The grain, as it passes to the apparatus, is hard and has a brown coating, Y, as shown at X of Fig. 7, and after the steaming process the coatings become separated from the berry, and when it passes into the machine F it is partly dried by suction from fan F^2, and much of the loose coatings are removed by the friction incident to the slats and brushes passing through it and rubbing it against the gauze cylinders H and H′. The grain is then thoroughly dried and heated, and treated in machine N, where all of the coatings are entirely removed, as shown at Z in Fig. 7, and finally the cleaned grain is dried and fed to the grinding-mill.

The attrition-machine F is used to treat the grain in a moistened condition and remove the greater part of the coatings, while the finishing or polishing machine N is used to treat the partly-cleaned grain in a dry and heated condition, and is adapted to subject the grain to a rougher treatment to insure the removal of the last traces of the exterior coating which have been loosened by the heating and steaming process.

It is necessary to have the berry or grain thoroughly heated before moistening the outer coating; or it may be heated during the moistening of said coating. This internal heat afterward aids in drying the grain—a feature which is absolutely necessary; and to insure the thorough drying of the grain before passing to the millstones I use the drier W. The decorticating processes have heretofore been failures, owing to the fact that it was impossible to thoroughly dry the cleaned grain when treated in the manner previously known.

In this application I do not claim the specific constructions of the attrition and polishing or finishing machines or the steamer, as they will form subject-matter of future applications.

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 the grain, then steaming it to moisten its outer coating, then treating the moistened grain with cold-air currents and friction or attrition, and when cold reheating said grain and subjecting it to a second frictional treatment and air-currents, substantially as and for the purpose specified.

2. The herein described process for cleaning grain, which consists in first heating the berry throughout and steaming the same, then subjecting said grain to attrition and at the same time exhausting the loosened coatings and moisture, causing the internal heat to come to the surface of the berry during the attrition action, then reheating the grain, then subjecting it to a second attrition, and finally subjecting said cleaned grain to dry heat before being ground, substantially as and for the purpose specified.

3. A grain-cleaning apparatus which consists of a steaming device, in combination with a conveyer by which the grain is fed from the steamer, an attrition and drying machine, F, a heater, K, through which the grain is passed to dry it, a brush or finishing-machine, N, provided with suction-fan U and suction-tube T′, opening into the discharge tube of said machine N, and a drier, W, through which the grain is passed, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

WILLIAM L. TETER.

Witnesses:
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SAMUEL E. CAVIN.