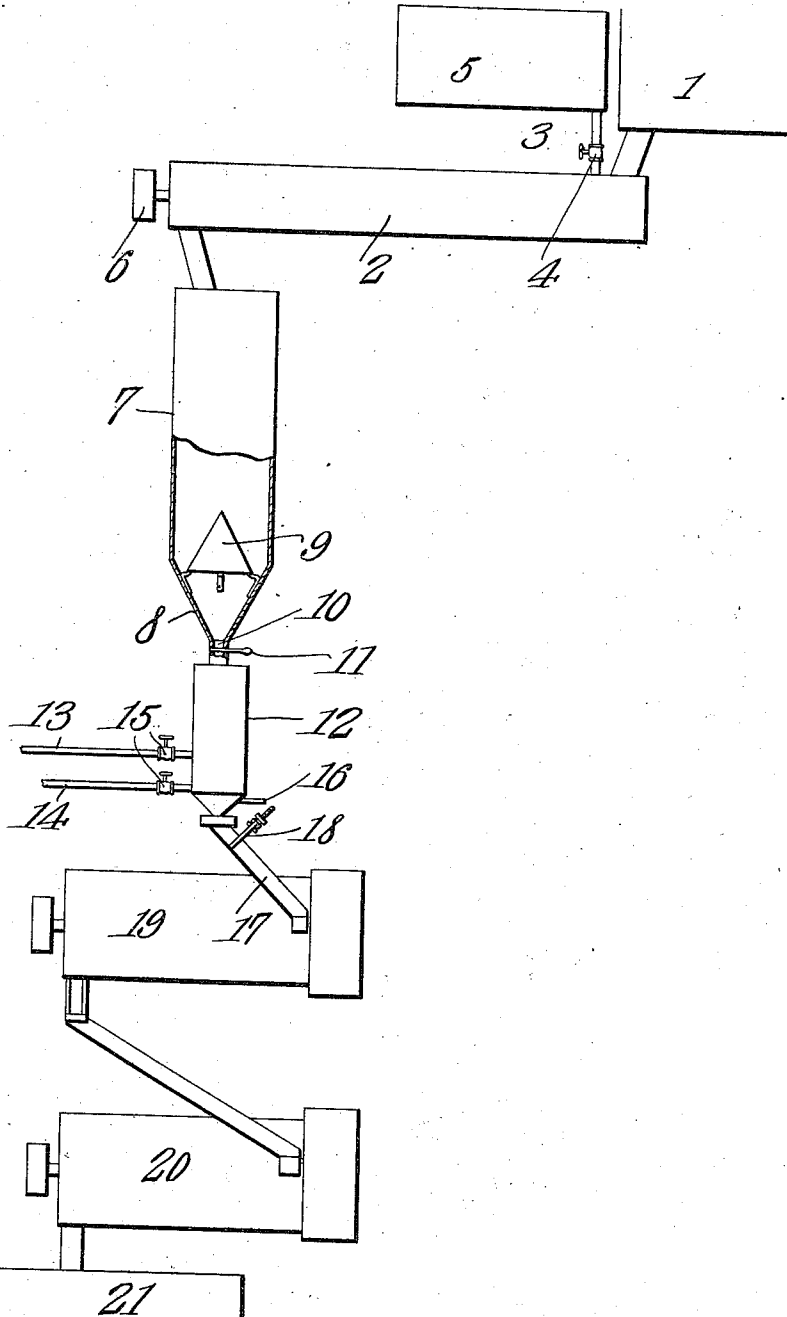


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N. ZIMMER.
METHOD OF CLEANING GRAIN.
APPLICATION FILED APR. 8, 1909.

Patented Oct. 18, 1910.



Witnesses

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NATHAN ZIMMER, OF HOPKINSVILLE, KENTUCKY.

METHOD OF CLEANING GRAIN.

972,977.

Specification of Letters Patent.

Patented Oct. 18, 1910.

Application filed April 8, 1909. Serial No. 488,658.

To all whom it may concern:

Be it known that I, NATHAN ZIMMER, a citizen of the United States, residing at Hopkinsville, in the county of Christian and State of Kentucky, have invented a new and useful Method of Cleaning Grain, of which the following is a specification.

This invention has reference to improvements in cleaning grain, and more particularly relates to a method of cleaning wheat preparatory to grinding the same into flour.

A wheat grain separated from the husk is found to have a surface consisting of several layers of cells which together form the hull or bran. The outer layer of the hull or bran, which layer is known as the "bee-wing", is usually contaminated by dirt and other deleterious matter, and often contains germs and insect eggs, which are harmful to the wheat and to the flour made therefrom. In the ordinary process of cleaning wheat preparatory to grinding the same it is customary to wet the wheat so that during the grinding operation this bee-wing will adhere to the hull or bran separated from the body of the grain during the grinding process, the bee-wing then adhering to the bran because of its moist condition and is carried away with the bran during the bolting process. However, quantities of this bee-wing are ground up very fine and pass through the bolting cloth with the flour and so serve to darken the flour as well as carrying into the flour germs and other deleterious matter which finds lodgment in the outer coating of the hull of the grain.

It is the object of the present invention to cause the separation of this outer coating or bee-wing from the grain in such manner that on passing the treated grain through a scouring machine the superficial layer of cells is separated from the wheat grain without disturbing the other layers constituting the bran. Thus the grain when delivered to the mill for grinding is thoroughly cleansed from all harmful matter and also matter liable to darken the flour produced from the grain by passing through the bolting cloth during the operation of bolting.

In carrying out the process or method forming the subject matter of the present invention various apparatus may be employed and so in the accompanying drawing forming a part of this specification a more or less schematic structure is shown and to

this drawing reference is had in the following description.

Before being treated to the method of the present invention the grain is passed 60 through a milling separator and a scouring machine in the usual manner. The grain is then deposited in a conveyer into which is sprayed or otherwise caused to flow a suitable quantity of water to moisten the grain. 65 The quantity of water cannot be given with strict definiteness since it will vary in accordance to the condition and kind of wheat, but about one pound of water to the bushel of wheat will constitute an average 70 quantity. The moistened wheat is carried along by the conveyer and is discharged from the latter into a suitable tank or receptacle in which the moistened grain is permitted to stay for a time say from ten to 75 thirty minutes thus allowing the moisture to penetrate the superficial covering of the bran or hull of the grain.

In the drawing the initial reservoir for the grain into which it is received after 80 having passed through the milling separator and the scouring machine after the usual practice, is indicated at 1, the conveyer into one end of which the grain flows from the reservoir 1 is indicated at 2, and the means 85 for introducing water into the conveyer is shown as a pipe 3 including a regulating valve 4 and coming from a storage tank 5 which latter may be taken as indicative of any source of water supply. The conveyer 90 may be of the ordinary type and consequently its interior construction is not shown in the drawings. The conveyer shaft may have power applied thereto through a pulley 6. 95

The tank or receptacle into which the moistened grain falls from the conveyer is indicated at 7 and this tank is shown as an upright tank with a hopper bottom 8 provided with a conical deflector 9 just above 100 the hopper bottom 8 so that grain passing through the receptacle 7 to the funnel end 10 of the hopper bottom 8 will be diverted toward the sides of the hopper 8 and therefore the tendency of the grain to travel in 105 a central stream through the tank 7 with a surrounding quiescent body of grain is prevented. The flow of grain from the bottom of the hopper 8 is regulated by a suitable slide valve 11. 110

The holding of the grain in the tank or receptacle 7 for a time allows the moisture

to penetrate the superficial covering of the bran and then the grain is permitted to pass into another tank 12 where it is subjected to the action of steam under pressure, the steam inlet and outlet pipes being indicated at 13 and 14 and these pipes include suitable valves 15 which may be of the type maintaining a constant pressure of steam in the tank irrespective of fluctuations of steam at the source of supply. A thermometer 16 may also be provided so that an observer may at all times ascertain the temperature within the tank. From the tank 12 the grain passes by a conduit 17 including a suitable regulating gage 18, to scouring machines 19 and 20 in series and then to a suitable bin 21. The steam acting on the grain within the tank 12 should be under considerable pressure and I have found in actual practice that about forty pounds steam pressure giving a temperature of about 297° Fahrenheit, gives most excellent results, but I have obtained good results at other pressures and therefore the invention is not limited to the pressure mentioned.

The theory of operation of the method is that the preliminary moistening of the grain at the conveyer and the holding of the grain in the tank or receptacle after leaving the conveyer chills and contracts the superficial layer and then the sudden heating of the grain by the steam expands the grain and causes the superficial layer or bee-wing to blister or peel away and break off. Now when the grain passes to the scouring machine this bee-wing is readily removed without affecting the under layers constituting the hull or bran. It is to be understood however that I am by no means confined to the theory advanced, but actual practice of the invention has shown that the superficial coating or bee-wing is most effectually separated from the body of the grain when the grain is first moistened and subsequently subjected to steam under pressure. The resultant grain is entirely cleared of the bee-wing and may then be ground and bolted

in the usual manner giving a very white flour free from all matter tending to degrade it. Furthermore the treatment to the hot steam thoroughly sterilizes the grain killing all germs and weevil eggs so that the wheat may be stored in bulk without harm.

In subjecting the grain to the action of steam the grain is permitted to flow in a stream through the steam and is thereby acted upon by the steam over the entire surface of each grain.

What is claimed is:—

1. The method of treating grain to remove the superficial or bee-wing layer preparatory to grinding the grain, which consists in first moistening the grain, then causing a blistering or loosening of the bee-wing layer without disturbing the underlying bran layers by flowing the moistened grain in a stream through an atmosphere of steam, and then removing the loosened bee-wing layer from the grain.

2. The method of treating grain to remove the superficial or bee-wing layer preparatory to grinding the grain, which consists in moistening the grain with cold water, then causing the moistened grain to gravitate in a stream through an atmosphere of steam under pressure to loosen or blister the bee-wing layer without disturbing the underlying bran layers, and then removing the loosened or blistered bee-wing layer from the grain.

3. The method of treating wheat to remove the superficial or bee-wing coating which consists in first moistening the wheat with cold water, and then flowing the wheat so moistened through an atmosphere of steam under pressure.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

NATHAN ZIMMER.

Witnesses:

E. HUME TALBERT,
F. T. CHAPMAN.