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S. JACOBSON

2,620,841

METHOD OF REMOVING HUSKS FROM OATS

Filed June 4, 1951

2 SHEETS—SHEET 1

FIG. 1.

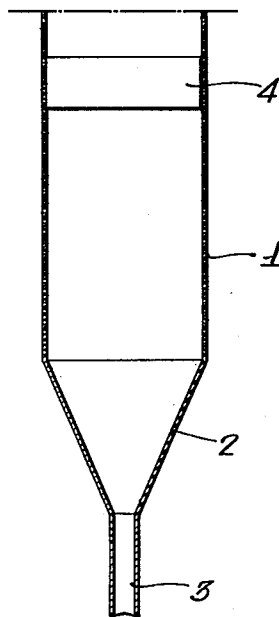
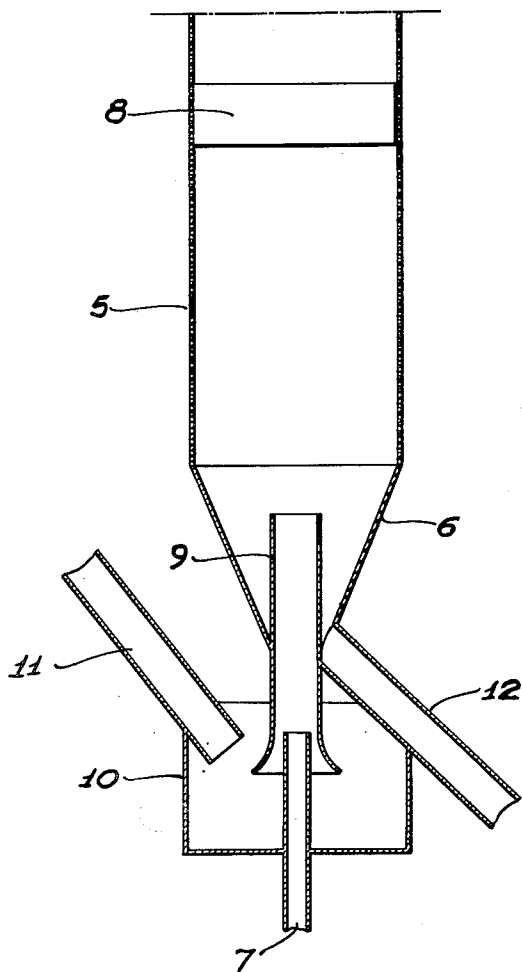


FIG. 2.



Inventor:
Sven Jacobson
by his Attorneys
Houison & Houison

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S. JACOBSON

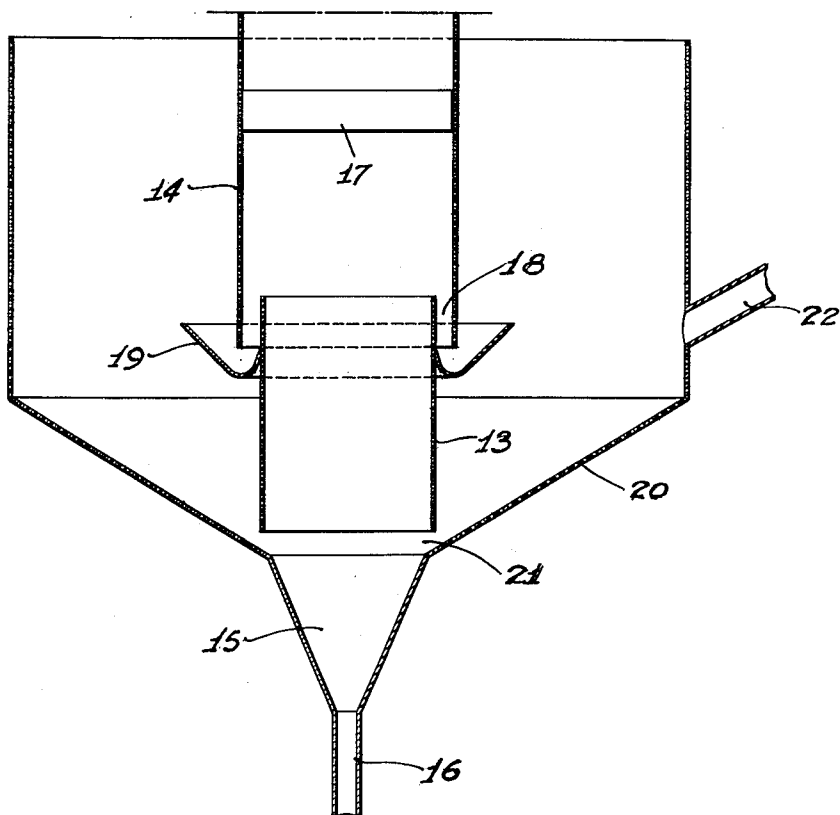
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2 SHEETS—SHEET 2

FIG. 3.



Inventor:
Sven Jacobson
by his Attorneys
Howson & Howson

UNITED STATES PATENT OFFICE

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METHOD OF REMOVING HUSKS FROM OATS

Sven Jacobson, Gothenburg, Sweden

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In Sweden October 19, 1944

4 Claims. (Cl. 146—221.7)

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This application is a continuation-in-part of United States application Serial No. 622,601, filed October 16, 1945, and subsequently abandoned.

Cereals, for instance oats, have usually been hulled after being subjected to a suitable preliminary operation by being passed through a husk removing machine in which the husks are removed mechanically, for example between a pair of stones. The usual methods however all have the disadvantage that the grain to a great extent becomes worn and broken resulting in considerable loss in the finished product.

The present invention has for its purpose to provide a method in which the above mentioned disadvantages are avoided and which will be simpler than the hitherto used methods, since it can be used without grading into sizes and which need not be preceded by a drying process to dry the grain.

According to my invention, the oats are subjected during a sufficient length of time to aerodynamic action to force open the husks or/and break them off and thereby lay bare the kernels.

Two embodiments of apparatus for carrying out the invention are illustrated in the accompanying drawing in which Fig. 1 is an apparatus for treating comparatively small batches of oats and Fig. 2 shows an apparatus for the continuous treatment of greater quantities. Fig. 3 shows an apparatus, which combines the advantages of the apparatuses according to Figs. 1 and 2.

In Fig. 1 the numeral 1 designates a cylinder of perforated plate or a screen, which is connected to an unperforated conical part 2. A pipe 3 is connected to the bottom of the conical part 2 and at its other end is connected to a source of pressure for instance a compressor or a blower not illustrated in the drawing. The upper end of the cylinder is closed by a piston 4, which is preferably adjustable for reasons which will be apparent from the following.

The husking or hulling process is carried out in the following manner. A suitable quantity of oats is introduced into the apparatus and the air pressure is turned on. The compressed air flows up into the cylinder, where it expands and then escapes from the cylinder by way of the perforations. The oats are thrown up into the cylinder and caused to circulate rapidly by the stream of air and are repeatedly exposed to the action of the air. During the operation, the husks are forced open and removed from the kernels. The powerful stream of air forces its way under the husks, which are opened up more or less like an open umbrella. The husks are then broken off,

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either through the direct aerodynamic action of the air or through the impact of the oats against each other, or against the walls of the cylinder. At the higher pressures the husks will be removed without the piston 4 and the piston should in these cases be removed. In this case means must be provided for gradually retarding the velocity of the oats, for instance a sufficiently long free trajectory or a cyclone. At the lower pressures, however, the effect will be increased if the piston is adjusted in a suitable manner so that the oats are thrown against it. It should be noted however, that the effect is decreased if the piston is positioned too close to the mouth of the pipe 3. The piston can in each individual case be adjusted so that the maximum effect is obtained.

The method can be carried out by continuing the operation until a certain quantity, for instance, 20 or 25% or more, of the oats has been hulled. The operation is then discontinued and the husks and the hulled oats are removed, after which the operation is resumed and continued in one or more further steps until the remaining oats have been hulled as completely as possible. Alternatively, the operation can be carried out in a single step preferably with higher pressure and during a greater length of time until 80 or 90% or more of the oats have been hulled.

It has been found that the pressure at the mouth of the pipe 3 should be of the magnitude of at least 2 kg./cm.² higher than pressure outside of the cylinder, and a difference in pressure of between 7 kg./cm.² and 10 kg./cm.² has been found suitable. The velocity of the air is preferably of the magnitude 300 m./sec. or more. The time required for completion of the operation is considerably increased if the pressure is lowered and can be somewhat shortened by raising the pressure. The greater the pressure, however, the greater will be the loss due to breakage of the kernels and the aforesaid pressure difference should not materially exceed 12 kg./cm.² The time is also influenced by the quantity of air per unit of time and by the quantity of oats in the batch. It has in some cases been found of advantage to increase the flow of air by increasing the diameter of the pipe 3 and at the same time lowering the pressure in order to diminish the breakage.

The apparatus illustrated in Fig. 1 is especially useful for making a quick and reliable examination of a sample of oats for determining the quality of a delivery of oats.

An apparatus for continuous operation is shown in Fig. 2, in which the cylinder 5, the conical part

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6, the pipe 7 and the piston 8 have the same functions as in the apparatus shown in Fig. 1. At the bottom of the conical part 6 there is, however, an entrance pipe 9 for the oats, surrounding the air pipe 7 and extending somewhat above the mouth of the latter. The pipe is enlarged somewhat at its lower end, which is located in a container 10 for oats. A supply pipe 11 leads from a larger container to the container 10 and serves to supply oats to the container continuously as oats are removed to the cylinder. A pipe 12 from the bottom of the conical part 6 serves to remove the hulled oats from the cylinder.

Fig. 3 shows an apparatus which may be said to combine the advantages of the batch method as used in the apparatus shown in Fig. 1 and the continuous method as used in the apparatus shown in Fig. 2. Before admitting the oats to the apparatus shown in Fig. 3 it is, however, necessary to grade them to size, the diameter of the grains of oats in each batch varying only within an interval of one to two tenths of a millimeter. Each grade of oats is treated separately in the apparatus.

The numerals 13 and 14 designate separate cylinders of perforated plate. The conical part 15, the pipe 16 and the piston 17 correspond to, and have the same functions as, the correspondingly numbered parts in Fig. 1. The cylinder 14 has a greater diameter than the cylinder 13 and an annular opening 18 is formed between the two cylinders. Whole grains of oats, husks and kernels escape through the opening 18 and are collected in a circular trough 19 under the opening 18 from which they are blown by the escaping air out into a chamber 20 surrounding the cylinders 13 and 14. The walls of this chamber are made as sieves, the size of the perforations being determined by the size of the oats being treated. The bottom wall of the chamber 20 is conical and slants toward an annular opening 21 leading back to the entrance to the cylinder 13. The husks and the hulled oats pass through the perforations of the sieve, but oats that have not been hulled pass back to the cylinder 13 and are again subjected to the action of the air. A fresh quantity of graded oats is supplied to the chamber 20 through a pipe 22 and by way of the cone 15 passes into the cylinder 13 for treatment together with the tailings. The quantity of oats entering through the pipe 22 can be regulated by suitable mechanical (weighing), electrical or optical means to correspond to the amount of hulled oats escaping from the chamber 20. In this manner, it is possible to adjust the apparatus to work evenly under the most economical conditions. In this apparatus, the most easily hulled oats are immediately removed and the breakage is reduced to a minimum, while more resistant oats receive the required treatment to remove their husks. The stationary sieve forming the bottom wall of chamber 20 may, if desired, be replaced by a suitable movable sieve to increase the effect thereof.

As previously set forth, the piston 4 or its equivalent, while in some cases desirable, is not essential to the operation of the apparatus. If present it should be adjusted to a position, readily determinable by trial, affording optimum de-

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hulling with minimum kernel breakage. Obviously, the position of the piston for optimum results will vary with the pressure of the air and the velocity of the oats.

The method can be used for hulling either dry or undried oats. Instead of air under pressure, a powerful flow of any other suitable gas, for instance steam, may be used. The chamber in which the hulling takes place need not be cylindrical, but may have any other suitable shape. It need not necessarily be made of perforated plate, but may instead have one or more suitably located escape openings for the air.

I claim:

1. The method of hulling oats comprising the steps of introducing the oats to be hulled into a chamber having an admission opening for a stream of compressed air and an escape opening for said air, and subjecting the oats to the repeated action of a continuous stream of compressed air entering through said admission opening and into contact with the oats to be hulled at a pressure of from about 2 kg./cm.² to about 12 kg./cm.² above that of the surrounding atmosphere, whereby the husks are forced or broken open and removed from the kernels solely by the direct aerodynamic action of said air on the oats.

2. The method of hulling oats comprising the steps of subjecting a mass of oats to be hulled within a confining chamber to the repeated action of a continuous, upwardly directed stream of compressed air projected into contact with said mass at a pressure of from about 2 kg./cm.² to about 12 kg./cm.² above that of the surrounding atmosphere and which passes with substantial freedom through said chamber, whereby the husks are forced open and removed from the kernels solely by the direct aerodynamic action of said air on the oats.

3. The method according to claim 1 wherein the air enters the admission opening at a pressure of from 7 kg./cm.² to 10 kg./cm.² above that of the surrounding atmosphere.

4. The method according to claim 2 wherein the air enters the admission opening at a pressure of from 7 kg./cm.² to 10 kg./cm.² above that of the surrounding atmosphere.

SVEN JACOBSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
124,848	Paige	Mar. 19, 1872
226,471	Arbuckle	Apr. 13, 1880
258,912	Goessling	June 6, 1882
269,741	Taggart	Dec. 26, 1882
1,699,441	Negro	Jan. 15, 1929
1,874,150	Anger	Aug. 30, 1932
1,950,069	Stein	Mar. 6, 1934

FOREIGN PATENTS

Number	Country	Date
20,917	Great Britain	Oct. 16, 1905
433,034	Great Britain	Aug. 7, 1935