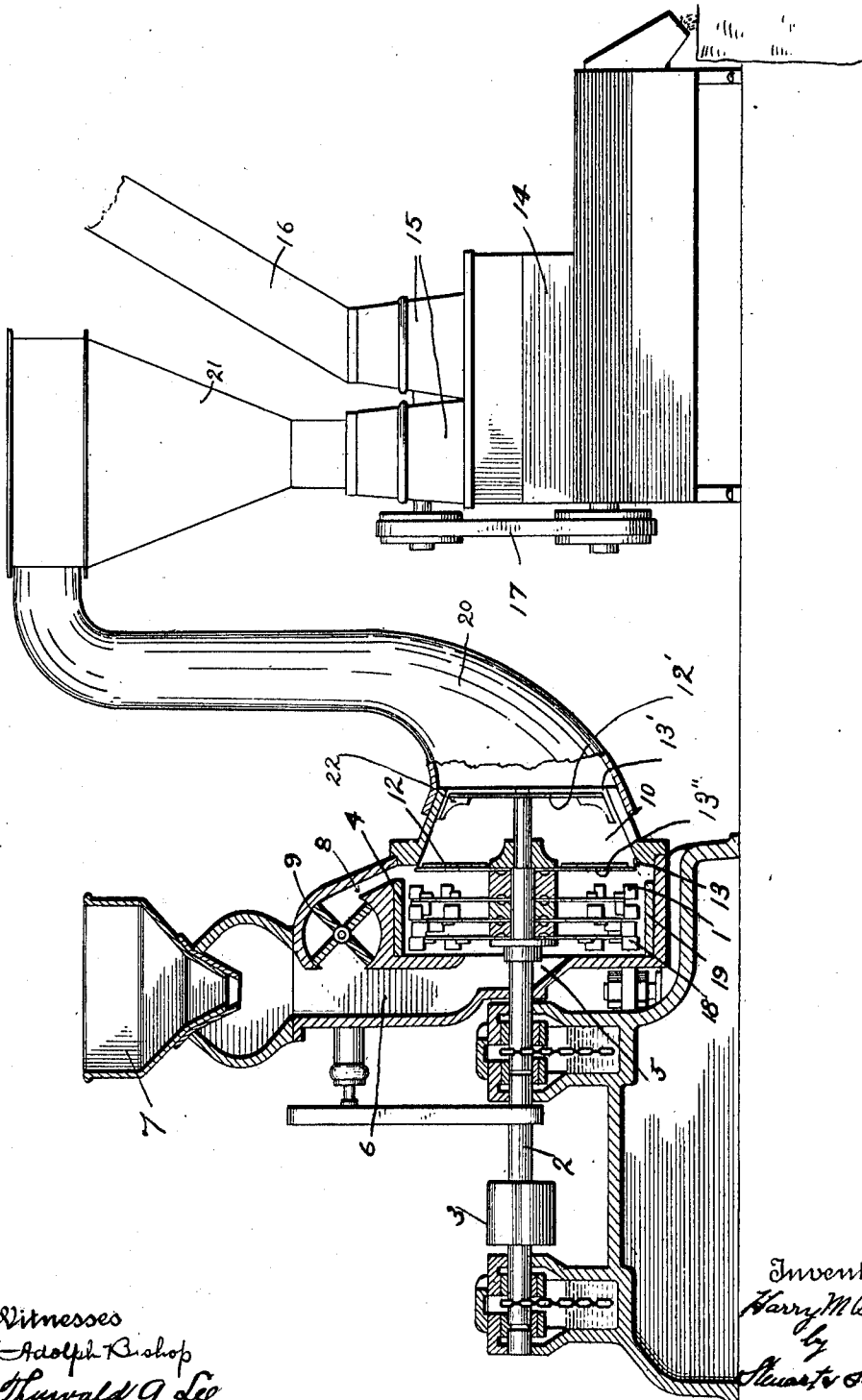


H. M. BLINN.
MILLING PROCESS.
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993,819.

Patented May 30, 1911.



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UNITED STATES PATENT OFFICE.

HARRY M. BLINN, OF BALTIMORE, MARYLAND.

MILLING PROCESS.

993,819.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HARRY M. BLINN, a citizen of the United States of America, residing at the city of Baltimore, State of Maryland, have invented certain new and useful Improvements in Milling Processes, of which the following is a specification.

This invention relates to a milling process, and its object is to improve any grade of flour middlings known by various trade names as middlings, shorts, ship stuff, etc., and meant to include any or all of that class of products from the process of flour milling, which consists of a mixture of the starchy and branny parts of the grain, so that they will become whiter and hence more attractive to the trade, drier, softer, and more easily mixable with water to form a slop which is a permanently uniform mixture of water with various ingredients of the middlings. For this purpose I utilize broken wheat berries, under-sized berries, germs removed by the scrubbers, etc., or other suitable materials, preferably by-products of the scrubbing and grading operations.

In the practice of my process I pulverize the grain, etc., to be used in treating the middlings, reducing it to an impalpable powder many times finer than the finest commercial flour. The entire grain, including the hull or bran, as well as the flesh, is pulverized, producing a powder much lighter in color than the material of which it is made, but ordinarily darker than the general shade of the middlings with which it is to be used. This powder is mixed with middlings in suitable proportions and thoroughly incorporated therein.

White or flour middlings are composed of a mixture of bran and whitish starchy particles. It is notable that the bran is of a brown or dark color and clean, and the starchy particles occurring in the middlings do not adhere to it.

It is an important feature of my invention that the particles of the admixed powder adhere to the bran in the middlings, coating each flake. It is particularly noticeable that while the powder produced by pulverizing the materials to which I have referred, is ordinarily slightly darker than the middlings, when thoroughly mixed therewith, it serves to lighten their general shade. This is due to the fact that while darker in shade than the middlings, it is lighter than the bran flakes, and the coat-

ing of powder on each bran flake gives it a color approaching that of the body of the middlings and makes it practically unnoticeable among the particles of lighter colored material which compose the balance of the middlings. Thus the product is very materially lightened in shade by concealment or neutralization of the dark particles.

Another important feature of my process is that the product is rendered softer in texture by covering the hard, brittle bran flakes and sharp granular particles with the fine, soft, impalpable powder. The sharp corners and hard surfaces of the bran, etc., are, in a way, padded by the covering of powder. White or flour middlings, the product in connection with which my process has been developed, are most commonly used as an ingredient of swill, slop or gruel for feeding young stock. This material when mixed with water to form slop, separates out, the bran and granular particles leaving the finer particles, and whole settles as an irregular mass. Such separation and settling is a matter of but a few minutes, so that animals fed at even the shortest intervals receive mixtures of different proportions. To achieve anything approaching uniform feeding, continuous stirring is necessary. Even when stirring is practiced, the last portions are found to contain a much larger proportion of bran than the portions of the mixture earlier removed. Middlings which have been treated in accordance with my process, owing to the strong adhesion of the fine powder, do not separate, but remain in suspension in the slop a very much longer time than does the untreated middlings. In this way feeding the material to the stock in a uniform condition is much facilitated.

In the practice of my process in its preferred form, before the powdered grain is mixed with the middlings, it is subjected to the action of a current of warm, dry air. In this way the powder is thoroughly dried and aerated so that all earthy or characteristic smells are eliminated, and the material is rendered more wholesome. The treatment with warm, dry air reduces the moisture in the powder below the normal for grain products which are produced at atmospheric temperatures.

It is well known to those skilled in the art, that in milling wheat, according to present methods, it is necessary to reduce the

brittleness of the branny coating. This is done to prevent the formation of small particles of bran which cannot be separated from the flour. The bran is softened in either of two ways,—one by adding water to the grain and allowing it to stand to temper the bran, and the other by heating the grain to draw its natural moisture to the surface. The result of each is that the outer coating of the grain, which forms a large percentage of the middlings, contains more than the normal amount of moisture, and the present product, known as middlings, is subject to quick deterioration from mildew. By the addition of the abnormally dry powder to the middlings, in accordance with my process, the relative proportion of moisture in the final product is reduced, and its keeping qualities greatly improved.

An apparatus consisting of a pulverizer, a collector, a mixer, and conveyers for supplying the powdered material and the middlings to the mixer, by means of which my process may be carried out, is shown in the accompanying drawing. This is a longitudinal, vertical, central cross-section through the pulverizer and collector, showing the mixing apparatus in elevation. The showing of one conveyer is fragmentary.

The pulverizer consists of a rapidly rotating beater "1" on a horizontal shaft "2" which may be driven by a belt from any suitable source of power engaging the pulley "3". The beater is in a closed chamber "4" having a central intake "5" so that the beater with its casing has the action of a centrifugal pump or blower. The inlet "5" is connected by an upright passage "6" with a hopper "7" to which the grain and like material to be pulverized is fed. Leading from the top of the casing "4" is a passage "8" in which is a rotating air lock and feeder "9" delivering into the upright passage "6" between the hopper and the inlet to the beater casing. The casing "4" has an outlet "10" to the pipe "20", the draft being checked by rotating disks "12 and 12'", which fit loosely in the opening leaving annular apertures "13 and 13'". The disk "12" also preferably has openings "13'" through its body portion. The pipe "20" connects the outlet "10" with a dust collector "21" shown as of the whirlwind type. This discharges into mixer "14", which is of any suitable type preferably having a continuous operation. It is provided with two feeders "15" into one of which the collector "21" discharges as shown. A second conveyer "16" carrying middlings, or other cereal to be treated, empties into the other feeder. The feeders and the mixer are connected by means of a belt "17" and are driven from any suitable source of power not shown.

In the operation of this apparatus to per-

form my process, the grain to be pulverized is fed to the hopper "7," moves by gravity down the passage "6" to the entrance "5" where it, with a suitable supply of air, is drawn into the beater chamber, the rapidly revolving beater furnishing an amply sufficient suction. The beater blades with the dogs "18" thereon, hurl the grain violently against the circumference of the chamber and against the corrugations "19" which may be provided for this purpose, reducing it to an exceedingly fine powder, hulls, and all being completely pulverized. The motion of the beater is so rapid that the friction which it and the air carried by it generate, is sufficient to heat the air and give the drying action to which I refer. However, this heating and other steps of process may be otherwise accomplished. The fibery portions of the material which longest resist the pulverizing action are separated from the impalpable powder which is the product of the pulverizer, pass upward propelled by centrifugal force and are fed into the passage "6" by way of which they are returned to the pulverizer. These particles pass through the beater again and again until their pulverization is complete. The separation of the larger particles referred to is the result of the combined action of the current of air which escapes through the openings "13 and 13'" and centrifugal force. All finer particles are carried along by the air current, but part of the coarser ones are disengaged therefrom by centrifugal force and thrown into the passage "8." The fine particles with some of the coarse ones pass through the openings into the outlet "10." The rotary motion of the mass is still kept up by the action of the rotating disks "12 and 12'" and the coarser particles, which, thrown out by centrifugal force, reach the outer strata of the revolving mass, strike against the backwardly inclined blades "22" and are thrown back through the openings "13 and 13'", so only the impalpable powder escapes through the annular opening "13'" to the pipe "20," by way of which it passes to the dust collector or separator "21." This delivers to a feeder "15" whence it is fed still at a temperature considerably above atmosphere to the mixer "14." The conveyer "16" brings middlings or other cereal to be treated to the feeder "15," and the two are thoroughly mixed, the impalpable powder being incorporated in the cereal and the larger branny particles of the middlings being completely coated by the powder so that their tint is neutralized with that of the product in which they occur, and their presence becomes less apparent to the eye. Mixing the powder thus treated, which is completely dried and aerated, with the middlings, which, as I have stated, is usually moist

and inclined to become musty, dries the product and greatly improves its keeping qualities. It is also important that the bran thus coated acts, when mixed with water, 5 similarly to the finer floury particles, so that middlings when treated by my process, are easily mixable with water to form a slop which is uniform in texture and which is a permanent mixture, the particles of which 10 do not easily separate from each other.

I have thus described in specific terms the single method of practicing my process and an apparatus by means of which it may be performed. However, the specific terms 15 herein are used in their descriptive and not in their limiting sense, and the scope of the invention is defined in the claims:

I claim

1. A milling process which consists in pulverizing grain in its entirety, whereby it is 20 reduced to an impalpable powder and coating branny flakes with the powder thus formed.

2. A milling process which consists in pulverizing grain, whereby it is reduced to an 25 impalpable powder, treating the powder with hot, dry air, and thoroughly mixing the powder with a product containing branny particles in the form of flakes.

3. A milling process which consists in pul-

verizing grain, whereby it is reduced to an 30 impalpable powder, treating the powder with hot, dry air, and thoroughly incorporating the powder while warm in a branny product the bran being in the form of flakes. 35

4. The process of rendering flour middlings easily mixable with water which consists in pulverizing grain to form a fine powder, heating it, and thoroughly incorporating the powder, while warm, with the 40 middlings.

5. A product consisting of flour middlings in which is incorporated a portion of impalpable cereal powder, the latter coating 45 the bran in the middlings.

6. A milling process which consists in pulverizing an entire cereal, both bran and starch, whereby it is all reduced to an impalpable powder, then mixing the powder 50 with middlings so that the bran in the middlings is thoroughly coated with the powder.

Signed by me at Baltimore city and State of Maryland this 17th day of December 1910.

HARRY M. BLINN.

Witnesses:

EDWARD L. BASH,
THORVALD A. LEE.