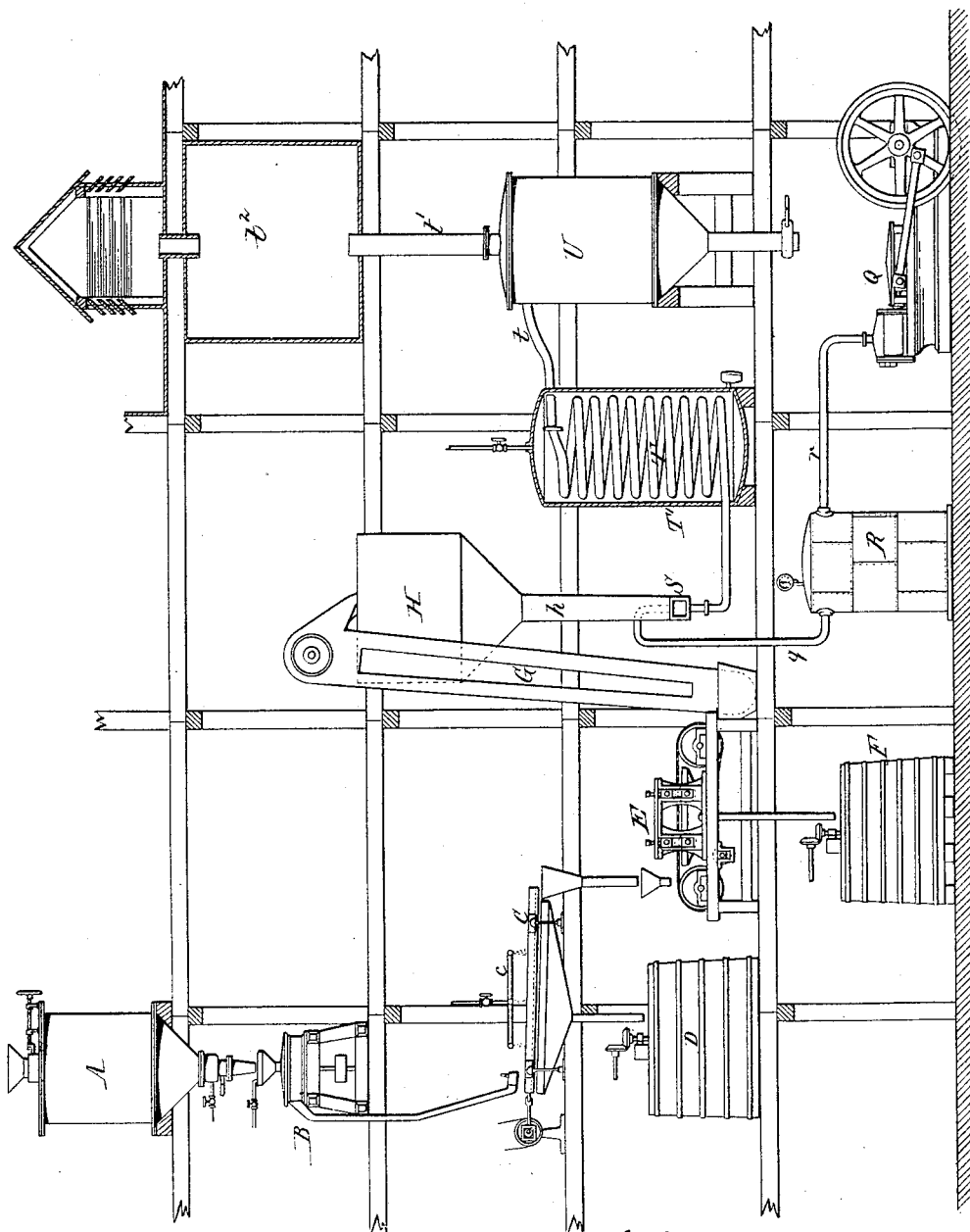


(No Model.)

J. C. SCHUMAN.
MANUFACTURE OF STARCH.

No. 344,412.

Patented June 29, 1886.



Chas. J. Buchheit.
Geo. J. Buchheit, Jr. } Witnesses.

J. C. Schuman Inventor.
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UNITED STATES PATENT OFFICE.

JOHN C. SCHUMAN, OF AKRON, ASSIGNOR TO WILLIAM T. JEBB, OF
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MANUFACTURE OF STARCH.

SPECIFICATION forming part of Letters Patent No. 344,412, dated June 29, 1886.

Application filed November 2, 1885. Serial No. 181,596. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. SCHUMAN, of Akron, in the county of Erie and State of New York, have invented a new and useful Improvement in the Manufacture of Starch, of which the following is a specification.

This invention relates to an improvement in the manufacture of starch from grain by the wet process, and has for its object to produce dry bran or offal at comparatively small expense, which offal forms a desirable food for cattle, and can be shipped over long distances or be stored for long periods of time without fermenting or souring.

The accompanying drawing represents a sectional elevation of a plant of machinery by which my invention may be practiced.

A represents the bin or receptacle, which receives the Indian corn or other grain from which the starch is manufactured, and in which the grain is preferably steeped for a suitable period of time, preferably from fifteen to twenty hours.

B represents a grinding-mill provided with a pair of stones, or of any other suitable and well-known construction, in which the grain is ground wet or in the presence of a stream of water.

C represents a shaking-sieve, which receives the stream of water and ground grain from the mill B, and which separates the starch-milk from the bran or offal. The starch-milk is washed through the meshes of the sieve C by sprays of water which are delivered upon the screen from pipes *c*. Any other suitable separator which separates the starch-milk from the bran or offal may, however, be employed—for instance, a centrifugal separator.

D represents a tank, which receives the starch-milk from the separator C, and from which the starch is taken and passed through the various subsequent treatments—for instance, mixing with alkali, settling upon tables or in vats, breaking and washing, which may be necessary in order to produce the desired product, whether green starch, laundry or culinary starch, grape-sugar or glucose, &c. The wet bran or offal escapes from the separator C and passes to a squeezing-machine, E, by which a portion of the water contained in the offal is removed therefrom. I prefer to

employ for this purpose a machine containing one or more pairs of rollers, between which the bran is fed by an endless traveling apron; but any other suitable machine may be employed for this purpose—for instance, a centrifugal machine having a perforated revolving basket. The starch-liquid which is pressed out of the offal is collected in a receiver, F, and worked up with the starch-liquid derived from the separator C, or separately, as may be preferred.

The bran or offal which escapes from the squeezing-machine is elevated by an elevator, G, to a receiver, H, which latter is provided with a discharge-spout, *h*. This moist bran or offal is next subjected to a drying operation in the following manner:

Q represents an air-compressor of any suitable or well-known construction. A cylinder machine provided with a reciprocating piston is preferred; but a rotary machine may be employed, if desired.

R is a receiver, which receives the compressed air from the compressor Q by a pipe, *r*, and from which the compressed air is conducted by a pipe, *q*, to the feeding device S. The preferred construction of the latter is described and shown in detail in another application for patent filed by me of even date herewith, and to which reference is here made for a complete description of said feeding device. This feeder connects with the lower end of the drying coil or passage T, which is arranged in a heating tank or jacket, T', which latter is preferably heated by filling it with steam. The moist bran collected in the receiver H is delivered by the feeder S intermittently or at regular intervals into the current of dry air, which is rapidly driven through the coil T by the compressor Q. In passing through the coil the dry air comes in contact with every particle of the moist bran and absorbs the moisture therefrom, which operation is expedited by the heat applied to the external surface of the coil in the jacket T'. The air which is blown through the coil T is preferably heated by passing it through a heating-coil, as described in my application for patent hereinbefore referred to. The discharge end of the coil T opens into a receiver, U, in which the dry bran or offal is deposited, while

the air is permitted to escape through a spout, *t*¹, into a dust-room, *t*². The bran which is collected in the receptacle U may be cooled, if necessary, by passing it through a current of cold air or in any other suitable manner. In this manner a dry sweet bran or offal is obtained at small expense, which forms a desirable food for cattle, &c., and which can be stored for a long time or shipped over long distances without undergoing fermentation or becoming sour, thus permitting the offal to be sold for consumption at distant points and increasing the value of the same.

I claim as my invention—

1. The herein-described process of obtaining dry offal in the manufacture of starch by the wet process, which consists in grinding the grain with water, then separating the starch-milk from the wet offal, then feeding the wet offal into a current of dry air, and causing the air-current to propel the offal through a pipe or passage in which the air absorbs the moisture from the offal, substantially as set forth.

2. The herein-described process of obtaining dry offal in the manufacture of starch by the wet process, which consists in grinding the grain with water, then separating the starch-milk from the wet offal, then removing by pressure a portion of the water contained in the offal, then feeding the wet offal into a current of air, and causing the air-current to

propel the offal through a pipe or passage in which the air absorbs the moisture from the offal, substantially as set forth.

3. The herein-described process of obtaining dry offal in the manufacture of starch by the wet process, which consists in grinding the grain with water, then separating the starch-milk from the wet offal, then feeding the wet offal into a current of air, and causing the air-current to propel the offal through a pipe or passage in which the air absorbs the moisture from the offal by the aid of heat, substantially as set forth.

4. The herein-described process of obtaining dry offal in the manufacture of starch by the wet process, which consists in grinding the grain with water, then separating the starch-milk from the wet offal, then removing by pressure a portion of the water contained in the offal, then feeding the wet offal into a current of air, and causing the air-current to propel the offal through a pipe or passage in which the air absorbs the moisture from the offal by the aid of heat, substantially as set forth.

Witness my hand this 28th day of October, 1885.

J. C. SCHUMAN.

Witnesses:

THOS. W. ADAMS,
T. A. JEBB.