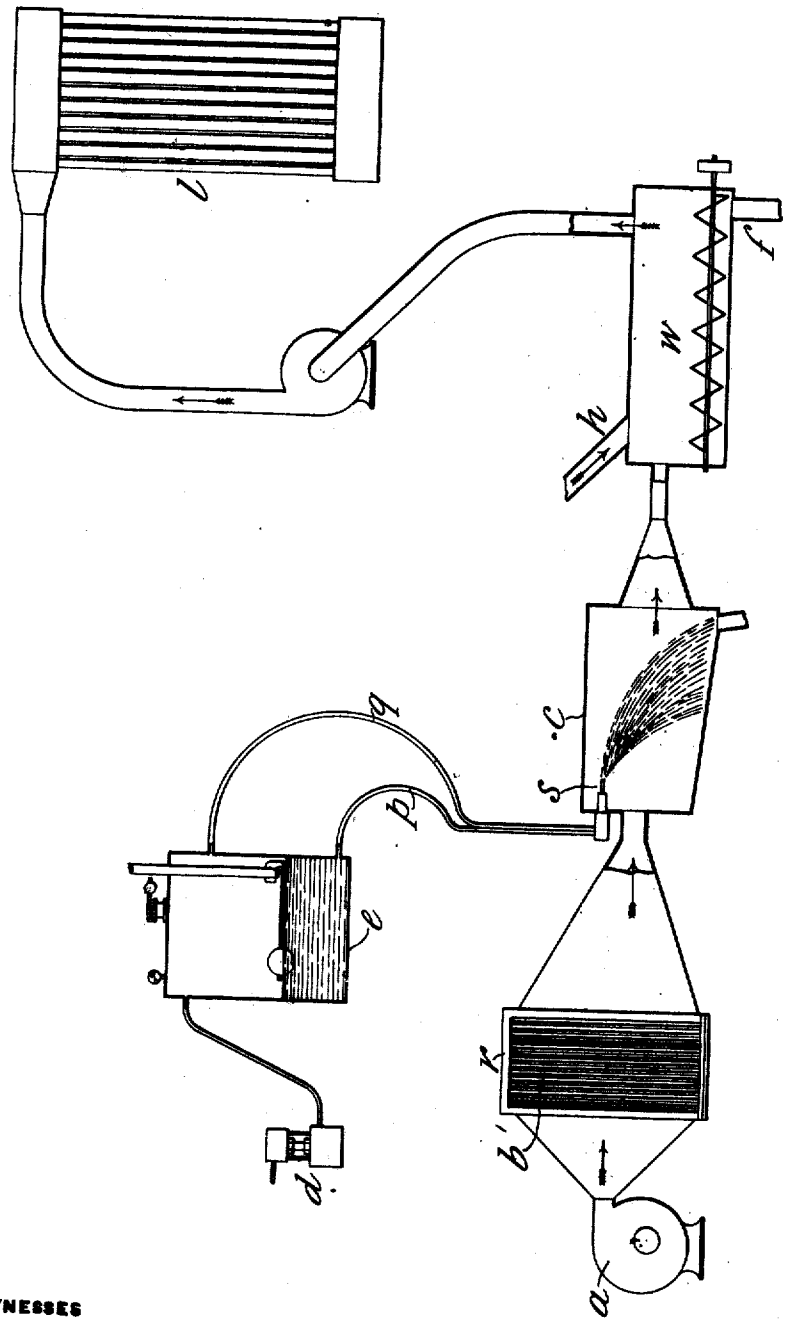
L. M. THOMAS.

ART OF MILLING AND CONDITIONING FLOUR FROM WHEAT.

APPLICATION FILED JULY 2, 1908.

1,010,202.

Patented Nov. 28, 1911.



WITNESSES

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ART OF MILLING AND CONDITIONING FLOUR FROM WHEAT.

1,010,202. Specification of Letters Patent. Patented Nov. 28, 1911.

Application filed July 2, 1908. Serial No. 441,649.

To all whom it may concern.

Be it known that I, LUCIEN MARCEL THOMAS, a subject of the Emperor of Germany, residing at Alter Weinmarkt, Strassburg, in the German Empire, have invented certain new and useful Improvements in the Art of Milling and Conditioning Flour from Wheat, of which the following is a specification.

This invention relates to improvements in the art of milling and conditioning flour from wheat.

The troubles known as "sweating" and pasting-up of bolting silks, etc., in a mill, are in large measure due to inadequate exhaust. When the miller attempts to employ a stronger exhaust on his rolls, centrifugals, etc., an additional loss of the moisture is incurred. This loss of moisture and corresponding loss in weight are due to the unavoidable drying of the material by the action of the exhausters and the heat generated during the process of milling. This loss is a substantial one, amounting sometimes to over 2 per cent.; it varies widely and in irregular fashion, according to certain indeterminate factors which cannot easily be controlled by the miller, such for example as the atmospheric temperature. The weight of flour produced by the mill from a given weight of wheat fluctuates correspondingly.

One object of the present invention is to counteract the drawbacks attendant upon the use of a strong exhaust by introducing water into the fully milled flour in such a manner that the same is uniformly permeated by the added water.

Further my invention by enabling the use of a stronger exhaust renders an increase in the capacity of the scalping and dressing machines and rollers and consequently in the out-put of the mill possible without any economic loss either in respect of evaporation of water or quality of products. The miller is also enabled to supply flour the composition of which will not vary from day to day and which will not give erratic results in the hands of the baker.

Another object of the invention is to condition the flour, that is, to improve its baking properties. I have found by extensive experiments that the flour from a large number of different sorts of wheat and wheat mixtures is improved in its baking properties by my process, and I believe that nearly all, if not all, sorts of wheaten flour can be so improved. It is easy to ascertain by a test on a small scale whether any given flour is capable of being improved in this respect by the process.

The invention consists in passing the fully milled flour through an apparatus in which it is agitated and in its passage subjected to the action of a current of moistened air or other suitable moistened gas, the rate of delivery of which, and the humidity of which relatively to the moisture in the flour, are such that the proportion of water in the flour is, on simply passing through the apparatus, increased by 0.1 per cent. or more, according to requirements. The proportion of water in the treated flour must not be in excess of that compatible with good merchantable flour.

While for obvious reasons it is most convenient to use air as the medium for conveying water vapor to the flour, other gases may be substituted for air, or be present in the air, provided they have no deleterious action on the flour.

A suitable method for obtaining a moisture-laden gas which will act in convenient quantities promptly upon the flour consists in passing a current of air through heated pipes and leading the heated air through a chamber in which water is being sprayed. Preferably the air is substantially saturated with water vapor in order that the required quantity of water may be imparted to the flour without heating it unduly.

The temperature of the moistened air brought into contact with the flour must not be so high that it damages the latter. I have obtained successful results even by using water-saturated air at a temperature of 88°–90° C.; but it must be observed that when such a high temperature is used the proportion of water vapor in the air is so considerable, and the tendency for condensation to occur is so great, that lumps are apt to be formed in the flour, unless precautions are taken to prevent the slightest cooling of the moist gas prior to its coming into contact with the flour.

There does not appear to be any advantage in allowing the air t_ be in contact with the flour for more than a few seconds, as the

transfer of moisture from the air to the flour occurs rapidly and equilibrium is practically speaking attained at once. When operating with a small moisture-gradient between air and flour, the air is removed immediately after contact with the flour in order that it may be replaced quickly enough by fresh moist air. With forms of apparatus from which the spent air would not otherwise flow away sufficiently rapidly, it is advantageous to provide an exhauster at the outlet; whereby a sufficient renewal of the moist air is insured. The rise, if any, in the temperature of the flour during the operation over its temperature as it comes from the mill should not exceed about 30° C.

The method of carrying the invention into practice which I prefer consists in passing air through heated pipes so that it attains a temperature of about 100°–120° C. and then through a chamber into which water having a temperature of 25°–45° C. is being sprayed. The substantially saturated air, having now a temperature of about 30°–50° C. and being substantially free from spray or drops of water, is led into a worm-conveyer through which the flour is passing continuously with vigorous agitation, and the spent air is drawn off at the other end of the machine by means of an exhauster. The flour and moistened air are led through the machine at such a rate that the former takes up about 0.6 part or more by weight of water per 100 parts of flour and its temperature is raised about 10° C.

I have observed an appreciable improvement in baking properties with an increment of 0.1 part by weight per 100 parts of flour but better results are obtained when the increment amounts to 0.6 per cent. or more.

While the process is intended primarily to be applied to flour as it comes fresh from the mill, I do not limit myself to such application, for I have found that flour which has been milled some time previously may also be improved in baking qualities by means of my process.

It will be understood that the apparatus for applying the process need not be in the same building as the mill.

In order that the invention may be clearly understood I append to this specification a diagram representing an apparatus suitable for applying the invention.

The fan *a* blows air through double-cone chamber *r* in which are situated a number of pipes *b* traversed by steam. The heated air passes from the chamber *r* into a second chamber *c* wherein is a spraying nozzle *s* fed with water through a pipe *p* and with air through a pipe *q*, both air and water being supplied from a tank *e* in which air is pumped by pump *d* to maintain a suitable pressure. From the chamber *c* the moistened air passes into a well-known form of worm *w* into the casing of which flour is fed through chute *h* and from which the flour is delivered through chute *f*. It being preferable that the pressure in the worm casing should be kept below that of the atmosphere; the casing is connected with a suction fan, the air being delivered from this fan through a filter dust collector *l*.

Having thus described the nature of my said invention and the best means I know of carrying the same into practical effect, I claim:—

In the art of milling flour, the improvement which consists in moistening air with water vapor, agitating the flour initially at normal temperature while in the presence of a current of the moistened air having a temperature sufficiently low to provide for the desired increase in moisture content and to prevent any rise in temperature of the flour of more than 15° C., and allowing the added moisture to remain in the flour, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LUCIEN MARCEL THOMAS.

Witnesses:
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