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METHOD OF ASCERTAINING THE MOISTURE  
CONTENT OF DOUGHY MASSES  
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Fig. 1

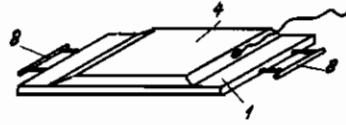
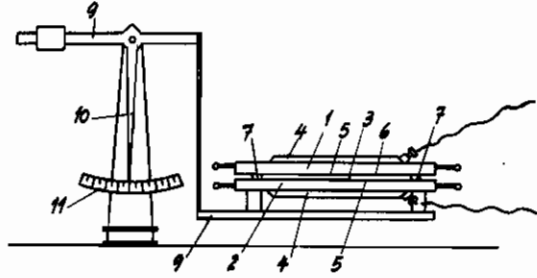


Fig. 2

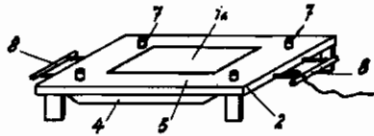


Fig. 3

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# ALIEN PROPERTY CUSTODIAN

## METHOD OF ASCERTAINING THE MOISTURE CONTENT OF DOUGHY MASSES

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In dealing with doughy masses, especially with flour dough, it is desirable to maintain the moisture content of the dough, i. e. the yield of dough, uniformly at a predetermined value, so as to obtain as far as possible uniform baked products in spite of variations in the moisture content of the flour and in its varying moisture absorbing properties, and, on the other hand, to save the quantities of flour, often added in excess of the predetermined amount, which may unfavorably affect the quality of the baked products. Even when the individual constituents and ingredients are accurately measured, it is impossible to be certain of obtaining a definite moisture content in the finished dough. Known methods of determining the moisture content in solid or fluid materials by heating samples in a closed space and observing the pressure and volume variations are too troublesome and time devouring to be usefully employed in the measurement of the moisture content of doughy masses such as flour dough. All known devices for determining the moisture content of grain, flour or other solid substances are intricate and costly, they are difficult to handle and the test takes too long to complete. In the preparation of dough, however, the individual operations succeed at definite short intervals, owing to the fermentation processes brought into play, so that only a very short time is available for examining and remixing the dough, and if this is exceeded the subsequent addition of flour or water is impossible.

The object of the invention is to provide a method which makes it possible to determine the moisture content of doughy masses in a very short time and with extremely simple and easily handled means, and which is especially suitable for examining flour dough or similar doughy masses and meets the requirements of practice in carrying out the test as fast as possible, by drying a sample and measuring the loss in weight.

This is attained by pressing a sample, after its weight or volume has been ascertained, into a thin layer, the moisture content of which is evaporated or driven off by direct heating applied to the surfaces in contact with the pressure plates and is determined by finally measuring the weight or volume of the treated sample. For this purpose an apparatus is used, in which the device for applying the pressure serves at the same time as the evaporating means, and is combined with the weighing and indicating devices into a complete unit. If it is desired to prevent the sample of dough from adhering to the pressure and heating plates after evaporation, it is pref-

erable to insert thin layers of paper, or other permeable and heat conducting material, between the sample and the pressure and heating plates.

A constructional form of an apparatus for carrying out the method according to the invention is shown diagrammatically in the drawing.

Fig. 1 shows in side elevation the pressing, heating and weighing apparatus.

Fig. 2 shows the upper pressure plate with the heating device.

Fig. 3 shows the lower pressure plate with heating device.

In carrying out the method, a sample of the finished dough, e. g. about 10 grms, is taken and pressed between two plates of a pressure device into a layer as thin as possible and of large area. The surface of this thin layer is then submitted to a sudden intense heating through the heating surfaces or plates which are brought into contact with it, so that, by using a suitable high temperature above about 160° C., the moisture contained in the doughy mass is evaporated and driven off. The sample layer is of such a thickness that, by exposing as large a surface as possible to the heating, the moisture content of the sample is completely evaporated within quite a short time, e. g. within a fraction of a minute or some such time, without burning the other constituents of the layer, such as the flour ingredients or the like. Finally, the moisture freed sample layer is weighed, alone or together with the heating or pressure device, according to how the weight of the sample of dough was ascertained before the start of the pressing and drying operations. The difference between the weight of the sample of dough before and after the treatment in accordance with the invention gives the desired measure of the moisture content of the mass of dough being tested, which is calculated according to the formula:

$$\text{Yield of dough} = \frac{\text{Weight of dough} \times 100}{\text{Quantity of flour}}$$

According to whether the ascertained moisture content of the doughy mass agrees with, or deviates from, the desired value, the dough may be submitted to the further stages of baking straight off, or flour or water may be added before further treatment until the moisture content reaches the desired value. The test in accordance with the invention is preferably performed after the doughy mass has been completed, i. e. after all additional ingredients have been mixed in, such as the main mass, leaven and so on.

The apparatus for carrying out the method

described above may, in its simplest form consists in two presser plates 1, 2 with flat surfaces adapted to compress the sample 3 into as thin a layer as possible. Furthermore, the presser plates 1, 2 may be arranged to serve simultaneously as heating plates, by providing the sides which come into contact with the thin layer 3 with a gas, spirit or electric heater 4 and heating surfaces 5, 6 respectively. The presser or heating plates 1, 2 are preferably arranged to be held at an exact distance apart, after the pressing operation has been carried out on the dough sample 3, by means of the spacing blocks or members 7. For the sake of easy handling, it is advisable to lay the dough sample 3 between two paper sheets or pieces of material 12 specially designed for this purpose, so that the dough sample 3 does not come into direct contact with the heating surfaces 5, 6 of the presser plates 1, 2 and so cannot stick to them. The separating layers 12 of paper or other material are only used once and are of uniform size and equal known weight. By means of a timing device set at the beginning of the drying process, the presser or heating plates 1, 2 may be automatically lifted away from the sample, or the heating operation may be otherwise terminated. If the heating or pressure plates 1, 2 are separated by hand, they are provided with handles 8 on the sides.

The heating device may be provided with a clearly visible temperature scale. In order to improve the compactness of the whole apparatus, the presser and heating device may be combined with a corresponding balance 9, with pointer 10 and scale 11, so that the method may be carried out in the smallest possible space and in the shortest time. Furthermore, the scale of the balance can be graduated so that the moisture content of the sample can be read off directly from the position of the pointer. If the weighing device only indicates the loss of weight of the sample of dough 3 dried out by the heating, the corresponding moisture content may be read or calculated from tables. The individual devices may, of course, also be set up and used separately, according to what is desirable in practice. Instead of weighing the sample 3 before and after the drying process, the volume may be measured, so as to determine the moisture content of the sample from the difference in volume before and after the drying process and the complete removal or evaporation of the liquid constituents. The invention is equally applicable in all cases where it is desired to test the moisture content of doughy masses in the shortest possible time and with the simplest possible means, without specialized knowledge.

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