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PROOFING

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The above term covers a multitude of sins in the bake shop. Experienced engineers in our industry agree that a high proportion of bread is harmed due to improper proof. Perhaps the two greatest faults are a general neglect of control of conditions during the intermediate proof between the rounder and the moulder; and overproof under improper conditions, in the pan. The elimination of these causes of poor bread lies along two lines of effort. First, adherence to those conditions of time, temperature, and humidity which experience and science have demonstrated to be best; and second, more efficient attention to the mechanical devices available for use.

Proper Conditions for Proofing

These may be stated in a very few words. For the intermediate proof, conditions of temperature must be such that under no conditions is the dough chilled. Yeast is very sensitive to a drop in temperature and even though this drop be but a fraction of a degree, the resulting bread will show the effects. A sufficient length of time must be allowed so that aeration has proceeded to an extent that the moulder can function efficiently, and a degree of humidity maintained which will permit the formation of a slightly dry film on the dough. This film, however, must not be of sufficient dryness or thickness to be of the nature of a crust, otherwise streaks will result. Under ordinary operating conditions an overhead proofer will take care of its own degree of humidity and for most moulders about 8 minutes will be sufficient time. The temperature factor must, however, be watched more closely as many doughs are chilled at this stage.

For the proof in the pan, a uniform temperature between 90 and 95 degrees Fahrenheit is best for all except special doughs, and a degree of humidity just sufficient to prevent crusting. The formation of a film on top of the dough is not desirable at this stage, moisture is worse than none at all. The use of an excess of steam in a proof box is a great mistake, results in condensation of water on the exposed inside of the pan, and causes the bread to go into the oven in a sticky, sweated condition. The time factor here very much upon the type of bread, type of dough, and nature of the oven. A is the attempt to get volume by means of extended proof. A much better loaf of bread will result if the fermentation of the dough is so regulated that a combination of short proof and greater expansion in the oven is obtained. Extended proofing period always harms the inside qualities of a loaf of bread. Ample kick in the oven enhances the inside qualities.

The Intermediate Proof

1. *On the bench.* In small shops many doughs, and in large shops some doughs are given their intermediate proof on the bench. Temperature control is here practically impossible by any means other than regulation of the temperature of the room. The same remarks apply to the percentage of relative humidity. Considerable good can be done by the elimination of drafts. Even when rounded up dough is covered while lying on the bench, a moderate draft can cause a decided chilling and crusting which inevitably results in streaky bread. It being impossible under practical conditions to control these factors even to a reasonable degree, the remedy lies in discouraging proofing on the bench and in the use of some mechanical device.

2. *The Merry-go-round and Tray Proofer.* These machines are to be recommended for small doughs. A general defect is a loose fit between the drawers, or trays, and the frame of the machine. This permits a draft which in the writer's experience causes every bit as much trouble as if the dough had been left on the bench. It is a good idea to use felt, for instance in the form of weather stripping, in such a manner that the cracks are eliminated. This will assist materially in the maintenance of proper humidity, with the elimination of crusting and resulting streaks. Incidentally these drawers and trays should have the old dusting flour which accumulates cleaned out at least once a day.

3. *The Overhead Proofer.* There are in general three types of overhead respectively cups, belts, or trays to carry the rounded up pieces of dough. These machines are mechanically rather efficient, carry such light loads, and run at such slow speeds that they will run for an extended period without any attention whatever. Eventually, due to absolute lack of care, particularly as to lubrication and cleanliness, trouble results. Sufficient noise is produced so that it is necessary to shout to the person next to you to be understood, and frequently the gears become so incased in dough that violent chattering results. The remedy is simple but seldom used. The manufacturer has provided means whereby the machine is readily lubricated, and easily cleaned. These points should have regular attention at least once a day. The alemite system of lubrication is by far the most efficient and those shops equipped with grease cups or plain oiling bearings will do well to convert all of their bearings into the alemite type. The original type of grease gun with a flexible hose connection appeals to the writer as being the most convenient to handle and a relatively soft consistency of grease should be used. Hard greases seldom reach every part of the bearing. It is also advisable to see that the grease is actually getting into the bearing which it is intended for. Many bearings on bakers machinery receive their lubrication through a long inch pipe|. A loose connection at an obscure point may allow the grease to escape, and thereby eventually ruin a bearing at a point which usually turns out to be quite inaccessible except by a general dismantling. The suggestion is offered that the manufacturers of bakers machinery supply durable charts giving the location of the bearings in their machines and making the pro per recommendations as to lubrication. The further suggestion is made that the supply pipes for the grease be brought together in groups as far as is possible. This will facilitate the matter of getting the baker to lubricate his machines properly, as the chart can refer him for instance, to the upper left hand corner of a machine where he may find a half dozen or so alemite connections requiring attention.

There does not seem to be any definite advantage for any specific type of automatic intermediate proofer. The advantages and disadvantages seem to be more or less evenly distributed. It seems to the writer that here is a point in the baking process at efficient machines are available from the mechanical standpoint, but the effect of which upon the finished bread we know very little about. There is a definite opinion in some quarters that a belt proofer gives a more uniform proof due to the several turnings over of the dough. In other quarters we find the opinion that bucket proofers are more sanitary because of a possibility of all metal construction, and more liable to give an equal proof in a shorter time because the dough is so much more gently handled. Others claim that the tray proofer has all of the advantages of the other two types and none of their defects. Probably most of these opinions are preconceived because of the originator's familiarity with that particular type of proofer. The only way in which definite information can be obtained is by strictly comparative tests. Such tests will also undoubtedly yield information of extreme value leading towards a better understanding of the action in, and the use of these more or less indispensible devices.

Belt proofers, properly operated, are reasonably free from doubles. The excellent service and will last many years if they are kept running in their proper the proofer and over their pulleys. If a 3-ply solid woven canvas belt is used which in addition is stitched along the edges, no difficulty will be had as to stretching or opening up of the belts because of the effect of humidity. There will be an initial stretch in any but after this initial stretch has been taken up, usually by a simple adjustment of the end pulleys, further attention to the belts is very seldom necessary.

All metal bucket proofers sometimes act irregularly due to a binding in the link-belt chains. Frequently a link is found which due to a defect or roughness in the metal causes the chain to bind and jerk when going around and when leaving the sprockets. Such links should be removed and filed smooth or replaced with a. new part. The humidity in these has a tendency to cause the chain to rust slightly. This can be avoided by wiping the chains once in a while with a rag soaked in a non-odorous lubricant, such as any oil suitable as a slab oil. Ordinary lubricating oil

should be avoided as the dough can pick up its odor. Doubles in bucket proofers using a multiple row of buckets can be avoided by lining the buckets with canvas held in place with spring clips.

In addition to these three types which find a rather general use, large special traveling proofers are met with in isolated cases. They constitute problems of an entirely individual nature which can only be solved by a study of the particulars of the specific case.

The Proof in the Pan

1. *The steam proof box for racks.* Such a box consists of a chamber barely large enough to hold one or more racks. Temperature and humidity may be provided in a variety of ways, the commonest of which is by the use of steam from a boiler. In this case an automatic regulator is practically indispensible. No hand controlled proof box ever maintains uniform conditions unless given constant attention. Sufficient radiation in the form of closed pipes should be provided to maintain 93 degrees Fahrenheit under any conditions, and the humidity may be maintained by means of steam jets, which should be in the bottom of the proof box and directed downwards. Any attempt to control temperature by means of direct injection of steam will result in fatally excessive humidity. There are many ways in which to avoid irregular and un-uniform temperatures in proof boxes. Probably the best cure for irregularity is a thermostatically controlled steam valve, and the best cure for non-uniformity installation of the heating pipes in the form of coil radiators hung on the side walls and protected by means of a screen open at bottom and top and hung about 6 inches in front of the radiator. Such an arrangement causes a definite circulation within the proof box resulting in elimination of hot and cold spots. In large proof boxes it may be necessary to install small auxiliary sources of heat at certain points which experience will locate.

Very small shops will find it to their advantage to use a one rack electrical humidified proof box which is available on the market and which gives excellent automatic control.

Very large shops are probably best served by means of the automatic blower type of apparatus which circulates through the proof box a stream of at the proper temperature and percentage of humidity.

2. *The traveling proofer.* In cases where the "automatic plants" are in use, a traveling steam proofer is usually found. These machines are, insofar as the writer's experience goes, quite efficient, and require little care from the baker. An expert mechanic is usually available in such plants who can maintain operating conditions as directed by his superintendent.

Recapitulation

Proper conditions for proofing both as to intermediate and pan proof have been set up.

Both proofing stages have been discussed from the mechanical standpoint leading towards a more general realization of ideal proofing conditions by bakers. Nothing has been said in the text regarding the use of instruments which will indicate or record these conditions, it being self evident that such instruments must be used if the conditions are to be known.

The suggestion is made that the intermediate proofing stage be made a subject for practical research as it is accomplished in general under uncontrolled conditions and with effects not definitely understood. The suggestion is also made here that temperature and humidity indicators, at least, be used more generally during the pan proofing stage.