Development of Roti Plant for Jalsa Salaana



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The Promised Messiah, in one of his books "An explanation of my Purposes" has quoted a couplet of Saadi Sherazi:

The clouds, winds, moon, sun and the sky
All are engaged (by HIM) to provide
you with bread
which you should not eat without
gratitude.
For your sake they are all obediently
carrying out
How unjust then it will be if you are not
obedient to HIM.

Our Jalsa Salaana provides the much needed spiritual food for our souls — its primary and sole aim. However, right from the beginning, arrangements are also made on this auspicious occasion to provide meals to the participants. Those responsible for these arrangements have to strive hard to provide 'ROTI' (bread) at meal times to such a large gathering with ever increasing numbers year by year. In course of time the matter became a formidable problem. The need for development and installation of an automatic Roti Plant as a substitute for the slow manual process was often talked about. This article gives an account of our efforts in this direciton.

Roti (bread) in Indo-Pak subcontinent is prepared and baked in a peculiar way. People have been used to it for very many centuries. The dough made into a ball is spread to form a disc before baking it. One method of baking, employed for large quantities, is by means of a *tandoor* (an earthen thin walled cylindrical structure, embedded in ground) using firewood as fuel. The discs (of dough) are stuck inside the *tandoor* on its heated walls. In early sixties firewood was replaced by natural gas as a fuel, it increased production only marginally but in no way a solution to the problem.

All possibilities for procuring a suitable plant for producing the conventional *roti* were explored during mid-sixties by Mir Daud Ahmad Sahib the then Afsar Jalsa Salaana and his Naib Afsar, Ch. Hamidullah Sahib. The Russian plant for making Georgian Nan, Flat-bread plant of Germany and a machine made by one Mr. Abdul Satar of PCSIR were not found suitable, for one reason or another for our purpose. A number of other proposals also came under consideration. It appeared a plant to meet our requirements will have to be devised by us ourselves.

An engineer from Karachi Mr. Naeem Ahmad Khan reported that a machine had been made by Karachi Gas and Electric Appliances for Dawood Textile Mills Karachi. The machine was examined and it also needed improvements. I on my own had been doing thinking about developing a *roti* baking machine and a student of mine who had seen me drawing sketches of it informed Mir Sahib about it. Mir Sahib asked me to make further improvements in the machine which inter-alia needed speed adjustments to suit varying heating and input conditions. For that reason a variable diameter pulley was inserted in the drive.

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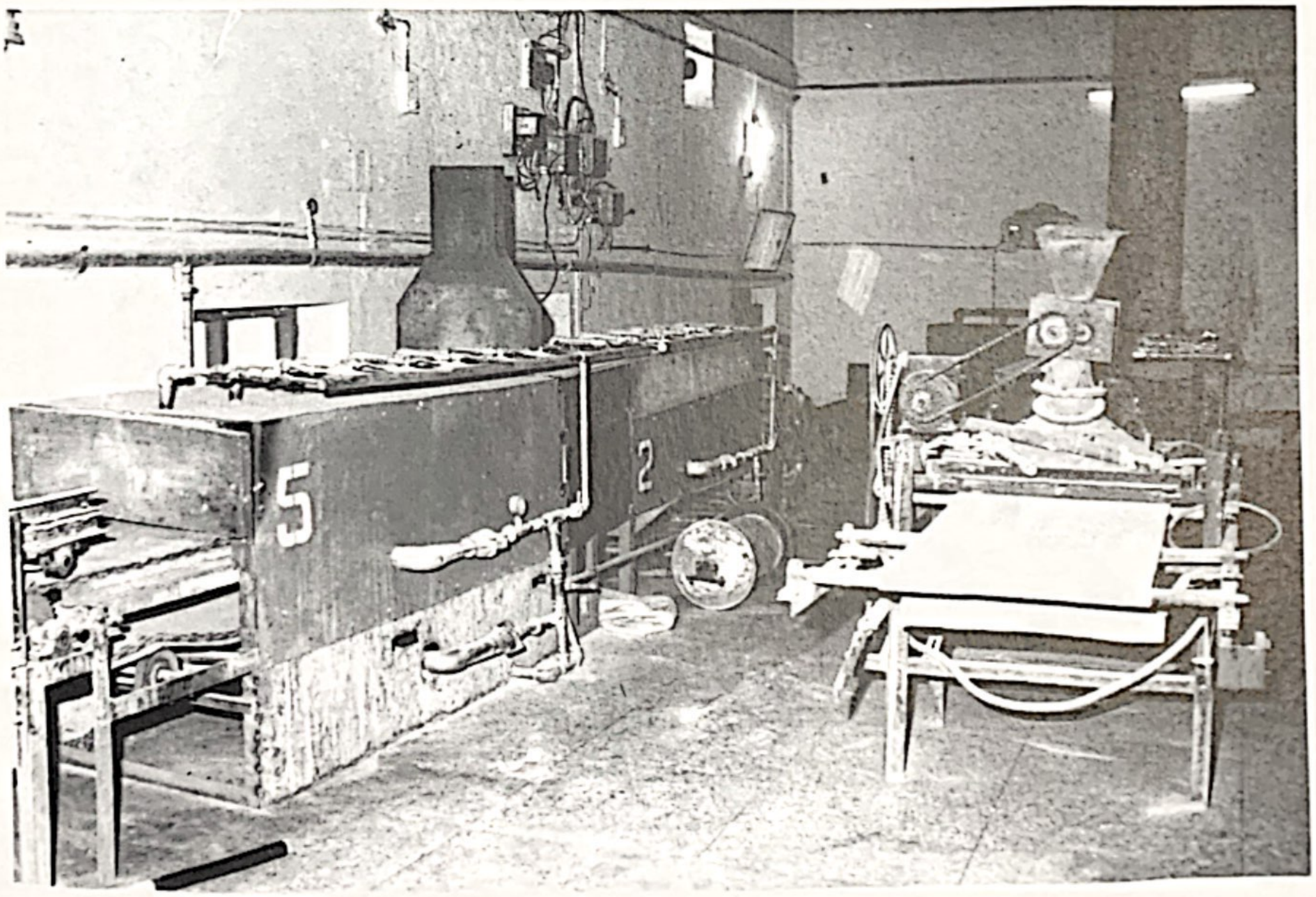
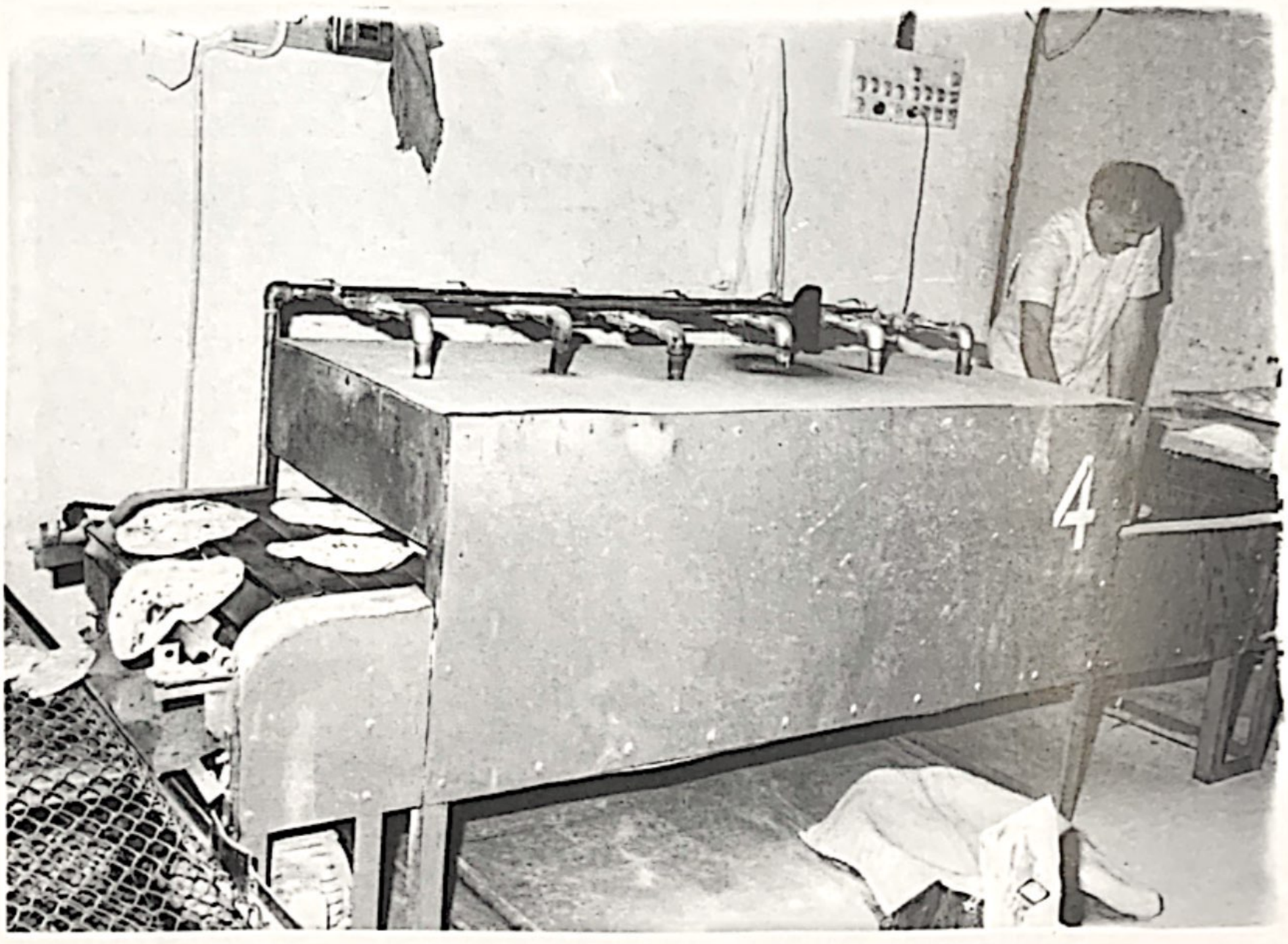
Chapaties are being placed on the moving hot plate.



A view of Roti Plant.



Cooked chapaties are being carried by the conveyor belt to the collecting end.



It was however removed later when an optimum speed was found out. Inferior radiant burners for heating the crust were also replaced by refractory burners as suggested and arranged by Mr. Naeem Ahmad Khan. The space on conveyor belt required by Nanbai (baker) laying the unbaked bread manually was also increased. This machine had the capacity of making 600 to 800 pieces of bread per hour. It was installed in Darul-Ziyafat. The staff there not only learnt the operation very quickly but started innovating. They fitted a mirror to see the baked bread on the delivery end of the conveyor and adjusted their input instead of changing the speed of the conveyor or its heating capacity. In case of electric failure, they used a bicycle to operate the roti plant.

An urgent problem was thus solved as it was easier now to get a *Nanbai* because less skill was required now, to stick wide bread on a wide conveyor instead of inside the *Tandoor*. After the success of this machine,few such machines were initially obtained from the same company, but later on they were fabricated in Rabwah under the supervision of staff of Jalsa Salaana. However, it was realised that the problem of Nanbais has not been eliminated by this machine. Once, the *Nanbais* had gone on strike and Hazrat Khalifatul Masih-III asked the participants of the Jalsa to observe Fasting. It was against the character of the Jamaat to reconcile with such a situation where *Nanbais* were in a position to cause disturbance. I was then experimenting with the extrusion of dough in the form of a flat sheet of bread to be cut into square pieces. This was a screw type, hand operated extruder, with a die to shape the dough. After several experiments, I succeeded in making a die, to produce the sheet of bread of uniform thickness, without any creases. This device was meant primarily to find out the design parameters. It was mounted directly on the oven conveyor to eliminate the need of a transfer conveyor and experiments were carried out with doughs of different consistency. The results were encouraging.

The important aspect of this approach was that I wanted to eliminate all intermediate steps and machines in conventional methods, such as dough divider, rounders, moulder, rollers, and cross grain rollers etc. Hazrat Khalifatul Masih-III, on knowing of this approach, observed in an audience that if the bread so produced retained the characteristics of a *tandoori* nan, members of Jamaat will without hesitation accept the bread despite its square shape.

I was then asked by Hazoor to make a machine based on this principle with a capacity of 2500 breads per hour. I had then thought these orders to be premature, but this wisdom I realised much later. Because of this attempt, so many hidden factors, not thought of till then, came to our knowledge. For example, the characteristics, the dough acquires or loses due to mixing, handling and dressed periods, and cooling and conveying and storage of bread, when produced at these rates. I was called upon to reach Rabwah with drawings and start manufacturing this machine and complete it before Jalsa. The Jalsa was barely three months away, so we worked day and night. The machine was completed during Jalsa days. However it was difficult to manage this machine because the extrusion speed, the conveyor speed, the thickness of the bread, and heating capacities and number of top and bottom burners were all adjustable and could be changed. The feeding of the dough was also in batches. It was quite a problem to obtain a thermal equilibrium before we were short of dough, that too of different consistencies. We had then, no proper knowledge of the chemistry of flour, the property of dough and cooking process. The manufacture and operation of this machine added greatly to our knowledge:

1) Fabrication experience gained, enabled us to manufacture such machines in Rabwah, using local resources;

2) an infrastructure for repair, operation and improvement of mechanised Langar Khana, such as cooling and conveying of bread from machines to store room and storage of bread.

It was clear now that automation will require machine mixing, a thorough knowledge of dough charactaristics and flour chemistry and that the size of the machine was too big to be handled by ordinary staff. It was also clear that if the input of the dough could be made constant, many variables can be cut out. Cooling and transport conveyors will be required for this scale of production.

Jalsa staff took care of the manufacture of new machines and conveyors from fabrication to operations and repair and maintenance. In due course of time, even Atfaal volunteers became well versed in adjustments and operation of machines.

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In the meantime, experiments on various mechanisms on staling and keeping qualities of bread, desirable properties of crust and crumbs and possible use of additives to control the properties of dough and bread were being discussed. Things were taking in a more scientific turn. The technical knowledge on the role of ingredients and on dough charactaristics were collected in the office of the Jalsa Sâlaana.

At Rabwah, for several years, machines were being added and new Langars opened till the stoppage of Jalsa Salaana at Rabwah. These were ably managed by Jalsa Salaana staff. During these years, experiments continued in Rabwah and Karachi. A machine was transferred to Karachi, where first at Mr. Qadeer's workshop and then in a rented workshop, experiments continued. A transfer conveyor with cutter was inserted between extruder and oven. When after successful experiments, the machine was shifted to Rabwah and it was found that some changes were still needed to suit the changes in flour and dough. At this stage it was decided to control and regulate the properties of dough input instead of continuously making changes in machines. This, I explained in a seminar of Lahore chapter of IAAAE under the chairmanship of Choudhary Hamidullah Sahib. From now on Bashir Ahmed Khan (Afsar-e-Jalsa) and Engr. Rafique Ahmed were experimenting and improving the machine at Rabwah. They changed the screw extruder to a two-lobe extruder. As the screw extruder often used to cause breakdown of dough. A relief valve was added to maintain a uniform pressure at the die opening and prevent breakdown of dough by checking the increase of pressure. The internal surface of the die was improved and cutting shifted to the delivery end of the conveyor, resulting in marked improvement in the quality of the bread.

In this period when Jalsa was not taking place in Pakistan and due to the stay of Hazart Khalifatul Masih-IV in England, the problem was shifted to Jalsa Salaana U.K. Mr. Abdul Samee Baseer, an expert of ovens and Choudhary Abdul Rashid under the instruction of Hazrat Sahib, took the work of an automatic plant in hand. As for the oven conveyor, there was no difficulty due to Mr. Abdul Samee Baseer's expertise, but for the bread making machinery, there was no solution in sight. I was then summoned by Hazrat Sahib to see if I could help. The meeting was held with Mr. Abdul Samee Baseer and the matter was postponed to the next Jalsa. Mr. Abdul Samee Baseer had informed Hazrat Sahib and asked for his prayers. He was then entirely depending on some miraculous breakthrough. When all of a sudden, just a month before Jalsa, he come across a design of a sheeter which resulted in successful rolling of flat bread by improving the sheeting properties using soya flour and lecithin. Hazrat Sahib mentioned Mr. Abdul Samee Baseer's despair and this breakthrough in his speech of Jalsa Salaana of 1986.

This machine has a three roller sheeter, a transfer conveyor and oven with controls of very sophisticated types including microprocessors. The oven is diesel fuel fired which will be very useful for the Jalsa at Rabwah in future. I was asked by Hazrat Sahib to submit my observations. In view of the facilities in U.K. and constant efforts of Mr. Abdul Samee Baseer and Mr. Abdul Rashid and several others of U.K. and Pakistan and above all the blessings of Hazrat Sahib, there are continuous improvements in the quality of the bread.

As advised by Saadi Sheerazi, we will be ungrateful if we do not acknowledge that it would not have been possible to reach this stage without Allah's help and the guidance of Hazrat Sahib. We should remember while eating Nan at Jalsa Salaana, that how unjust then it will be if we are not obedient to HIM.

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