Continuous Sheeting and Packaging of Pastry Type and Other Fats

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ABSTRACT

High speed production of sheeted roll-in pastry fats, margarine, and butter is featured in a general discussion. Methods of processing the fat products to be sheeted, including the use of scraped surface heat exchangers and continuous and vane type butter churns, are included. Various means of connecting the processing function to the sheeting and packaging equipment, including fully closed systems and open hopper systems, round out this discussion on provisions now available to set up fully continuous processes to handle products from liquid, emulsion, and churning cream stages to finished packages for industrial and consumer use.

INTRODUCTION

For the purpose of this discussion, sheeted fat products cover 3 general classifications: (a) various roll-in types of compound fats, margarines, and butter used in the baking industry; (b) solidified fats in controlled portions with large surface area in comparison to volume for quick melt-down in frying type operations, and (c) consumer types of margarine and butter sheeted and cut into small individual portions for use principally in volume institutional feeding and restaurant service.

Products sheeted for industrial use are usually in the range of 8-11 in. wide by 14-18 in. long by 3/8-5/8 in. thick and weigh ca. 2½-4 lb. These sheets may be either 1 single piece for roll-in purposes or cut into perhaps 8 portions for quick melt-down in frying operations. Production rates for these industrial sizes can be from a few thousand lb to 15,000 lb per hr.

Smaller sheets of margarine and butter produced at rates up to 2400 lb per hr measure 5 in. wide x 6 in. long x 1/4-3/8 in. thick and weigh 1/3-1/4 lb per sheet. These sheets are in turn cut into individual portions of various sizes requiring 16-100 pieces to weigh 1 lb. In a restaurant, when a person is served these portions, or "chips" as they are commonly called, triangular shapes are margarine and square or rectangular shapes are normally butter unless marked otherwise.

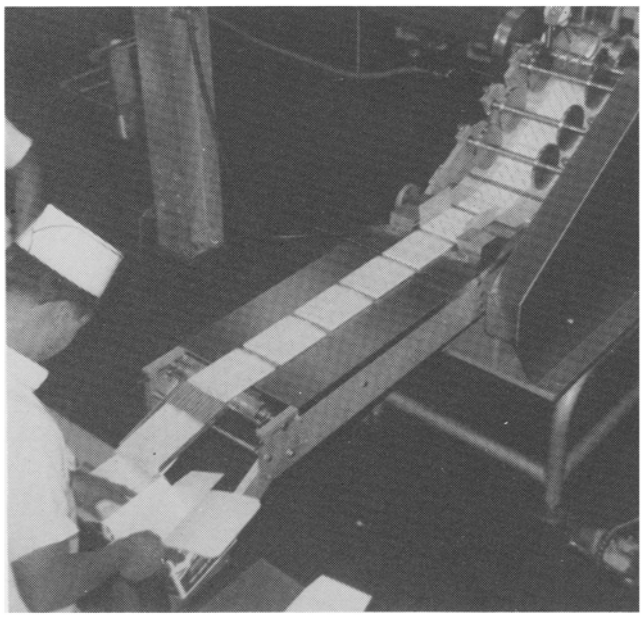

FIG. 1. New sheeting and wrapping machine handling 5 x 6 in. margarine chips at 2400 lb. per hr.

BRIEF HISTORY

At Edmunds Machine Company, sheeting of fat type products began on a crisis and necessity basis.

In the spring of 1950, federal taxes on margarine were repealed, effective July 1st of that year. Some new restrictions were added, however, especially pertaining to serving margarine in public eating places. Individual portions had to be triangular in shape, or could be served resembling butter only if the serving dish was clearly marked "margarine" or "oleomargarine."

Since many eating places had been making their own portion servings, or chips, by slicing ¼ lb sticks of margarine into thin squares, the additional problem of marking serving dishes or making triangular chips at the restaurant level opened a new field for margarine manufacturers. The challenge intrigued and pushed Edmunds into fast action because a good bit of the small plant's business was "no carton" ¼ lb sticks packed especially for restaurants.

FIRST METHOD

Edmunds manufactured margarine by means of a closed, scraped surface heat exchanger. As manufacturing and storage space was very limited, it was decided to try to make margarine chips on a continuous basis by extruding the solidified product through a fan type extruder connected to a setting tube that friends at Votator call a "B" unit. In conjunction with the extruder—which had an adjustable thickness control between 1/4 and 3/8 in. and produced a ribbon about 5 in. wide, blades in an externally heated, free wheeling drum cut off the scored sheets and dropped them onto a faster moving conveyor belt. Some of these blades formed triangles that first deep scored the extruding ribbons; other, deeper cut-off blades were placed ca. every 6 in. crosswise on the drum's diameter. Packers then placed a piece of parchment on the sheets of margarine chips. As the product went around the end conveyor pulley, the chips dropped off, paper was folded around them, and the wrapped sheets of chips were placed in 5 lb cartons, each sheet of chips weighing 1/3 lb.

This process proved suitable for its time, but wage and hour laws and greater capacity demands prompted a more automatic approach.

A NEW PROCESS

Figure 1 shows a new sheeting and wrapping machine. This machine makes margarine chips in 5 x 6 in. sheets which in turn are cut into individual portions clear through to the paper. Because the chips are actually slightly separated from one another, there is no need to break them apart by hand or cut along score lines as in old fashioned methods.

The machine, which operates at 2400 lb per hr, or ca.

125 sheets per min, is not limited to the sheet size pictured. In the application of roll-in pastry, the same basic machine is designed to cut product into sheets weighing ca. 2½-4 lb each. With these larger sheets paper can be folded and product loaded into boxes just as in Figure 1.

In the case of sheeted roll-in pastry, ca. 75-85 sheets per min is a reasonable speed, regardless of thickness. This equals ca. 9,000 to 15,000 lb per hr depending on thickness. Normal pack is ca. 30 lb per case.

All machines are equipped with variable speed drives which are synchronized to flow of product. By changing certain gearing and using full range of the variable drive, almost any speed can be obtained.

Thus far, most applications of the various size configurations of the sheeter-wrapper have been in conjunction with internal scraped surface heat exchangers, making a completely closed system from liquid emulsion tanks to extruded product. In recent years, however, installations in butter processing operations have been made where sheeting and packaging is done directly from the churn. The principal butter product thus far has been square portion chips, much the same as in Figure 1. The major difference is that each individual chip is embossed with the word "butter," or a design suitable to the customer, by a rotary die synchronized just beyond the chip cutter. Butter, whether from the newer continuous churns or the batch type vane churns, is in some cases a little softer than margarine direct from a scraped surface heat exchanger. This has necessitated a more careful handling of the packaged product until it is further chilled in cold storage. New methods to firm up soft butter are being experimented with as is the use of nitrogen gas, not only to make a larger chip or more chips per lb, but also to extend shelf life.

Whether butter is produced in continuous churns such as the French designed and built Simon churn or batch type vane churns, the process of supplying product to the chip sheeter machine involves extruding or unloading the finished butter into holding trolleys up to 10,000 lb capacities. These trolleys have large twin screws in the bottom and force the butter into a special pump for transfer directly into the extruding tube of the chip sheeter machine.

Another application of the sheeter machine is making chips from cube butter which has been frozen or kept in cold storage. In this instance, a German Benhil microfix is utilized to soften and work the butter for discharge into a Benhil screw type pump feeder and then through the extruding tube to the chip sheeter machine.

Even flaky French type pastry is put in sheet form rather than a bulk package. The dough is first rolled into a sheet, onto which is applied puff pastry type fat. This combination is then folded and rolled several times, making very thin alternate layers of dough and fat, finally resulting in a high rising pastry shell. The baker then simply folds back the paper, places the fat on the dough, and peels off the paper. He is then ready to fold and roll. The fat and dough are evenly layered and the baker does not have to dip into a cube or break off pieces from a 5 or 10 lb parchment wrapped block. Matching wts of fat to dough is easily and consistently repeated.

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