Cutting Tables for Brick Plants

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Four main types of cutting tables used in the brick plants making wire-cut bricks are described. Their main features, principles of operation and relative advantages and disadvantages of each type are discussed. The necessity of developing an automatic cutter for indigenous brick plants is emphasised.

Introduction

CUTTING tables are an important item in the manufacture of wire cut bricks. The design and shape of these tables went through a series of changes with the increase in the rate of production of bricks in extrusion machine and also with the increase in the stiffness of the clay column. The latter has introduced the moving type cutting wires in place of stationary cutting wires. The higher production rates have led to complete mechanisation and automation of the operation of the cutting table. The essential requirements of a cutting table, however, remain the same, viz. that it should cut clearly and rapidly, and the units that are cut should be accurate in shape and size.

The cutting tables that are currently in use can be classified into four distinct categories.

1. English Class

It consists of fixed vertical frame with a battery of vertical wires fixed to it (Fig. 1). The clay column issuing from the die of the brick machine is received on the rollers (shown at the right side of Fig. 1) and is cut by a single cutting wire into a cake slightly longer (1 to 2 inches) than the exact length required for the total number of bricks. The clay cake is pushed by hand in front of the moving frame of the cutter followed by pushing it through the stationary wires, cutting normally 8-10 bricks per cut. The bricks are then delivered on to the pallet. Every cut produces two waste ends. This type of cutters is not successful in handling stiffer clay columns. The hand-operated version can easily cope with a production rate up to 2000-2500 bricks/hr. With the increase in the rate of production, these tables have been fully mechanised or automated either by "Pneumatic Operation" or by "Electro-mech. Operation." Bradley and Craven Ltd. of England have marketed a number of such cutting tables of different capacities.

2. Travelling Class

In this class, the cutting table is mounted on wheels which run on a short pair of rails, so that when the clay column issuing from the die eventually strikes against a vertical stop at the front end of the table, it pushes along the rails. The clay column and table then move at the same speed. The main feature of the travelling type of cutting tables is that it avoids the formation of waste ends. In the stationary wire type (Fig. 2) the clay column issuing from the die is cut by a single cutting wire at the rear of the table into a clay cake of exact length required to produce a certain number of bricks. The attendant pulls the table towards him thus creating a gap between main clay column (issuing from die) and the clay cake. It is then cut into bricks in the manner described in the "English Class" type of cutting tables. The table is then pushed back and the operations repeated. Being a stationary wire type, it is not very efficient in cutting stiffer columns. The production rate is also limited to about 2000-2500 bricks/hr. In the "moving wire type" (Fig. 3), the cutting of clay cake from the column is not required. The bricks are cut by radially

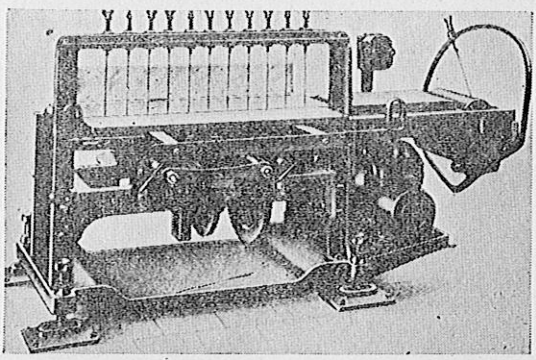

Fig. 1—An English class of cutting table (after Searle).

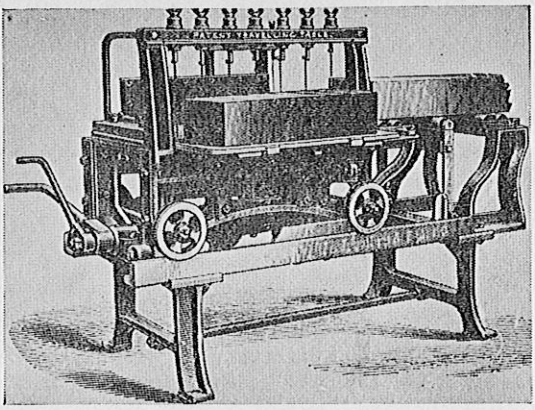

Fig. 2—A travelling class (stationary wire) cutting table (after Searle).

moving wires as soon as the table starts travelling by the clay column thrust. A quick operation of the cuttting table handle creates a gap between the cut bricks and clay column. This is followed by clearing the cut bricks from the table. The hand operated moving wire type cutters can cope with the stiffer clays but cannot handle production rates higher than 3000-3500 bricks/hr.

3. Chopping Class

In these cutters a taut wire descends, cuts the clay column and rises again sharply ready for the next cut. 'Keller' and 'Frey' are the two cutters commonly used.

(i) *Keller type*: It is an automatic cutter normally provided with a single wire bow which cuts the clay column in a chopping action. The cutter (Fig. 4) is equipped with the measuring belt which is moved by the clay column issuing from the die. The movement of the

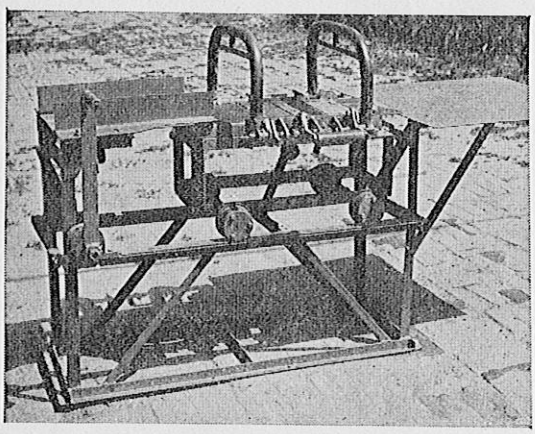

Fig. 3—A travelling class (moving wire) cutting table.

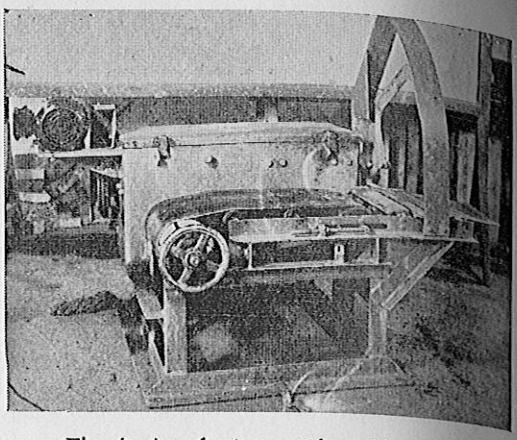

Fig. 4—A reeler type cutting table.

measuring belt operates a synchronizing mechanism which controls the frequency of cutting by the single wire bow. The sharp cutting action gives almost a square cut. The single cutting wire immediately returns to its original position. This leads to damage of brick corners if the preparation of clay is slightly varying in stiffness. This type of cutters is quite suitable up to a production rate of 6000 bricks/hr and can cut the stiff columns very efficiently.

(ii) *Frey type*: It is also of automatic type in which cutting wire or wires move vertically downward as against radial in the Keller type, ensuring a better and cleaner cut. It is especially suitable for hollow blocks and tiles. Its other working details are similar to the Keller type. It is suitable for stiff clay column, and gives production rates up to 6000 units per hour.

4. Reel or Rotary Class of Cutters

It is basically a mechanised and automated form of moving wire travelling type cutting table, in which cutting operations are guided by a measuring belt (Fig. 5). It is essentially rotating in action, cutting normally 7-20 bricks during 120° rotation of its cutting. In one

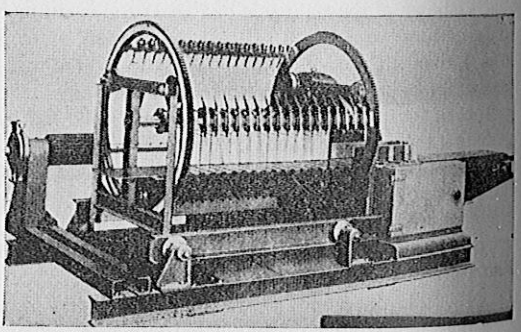

Fig. 5—Automatic reel type cutting table.

popular type of such cutting tables the measuring belt is provided as an extension to the table. When a given length of the column has been extruded, a cam secured to the terminal pulley of the conveyor releases the table lock, thereby allowing the reel on which the cutting wires are mounted to move forward with the column. At the same time the cam engages a clutch, which rotates the reel through one-third of a revolution. The wires pass through the clay column and take a rotation. Another clutch is then engaged which returns the reel to its former position nearer the die and engages the table lock ready for the repeat operation. The bricks are pushed out of the end of the reel by the following column. As the cutting wires do not come back through the same cut, this type of cutters can tolerate slight variation in the clay preparation. These cutters can handle production rates up to 12,000 bricks/hr. They can also handle stiff columns of clay very efficiently.

Concluding remarks

Extrusion machines are now being introduced in the country in a big way for the production of building bricks. A number of mechanised brick plants have been set up using imported machines including the cutters. The Central Building Research Institute has also developed a machine having an output of 3000 bricks/hr. It is anticipated that in the near future extrusion machines of even higher production rates may be in demand for which the hand operated cutters will not be suitable, and there is a pressing need to develop and manufacture automatic or semi-automatic cutters in the country.

References

1. Searle, A. B., *Modern Brick Making*, Ernest Benn Limited, London (1959).
2. Clews, F. H., *Heavy Clay Technology*, The British Ceramic Research Association, Stoke-on-Trent.