

heater, the one immediately above and that directly below it are of paper; and the remaining two, one at the top and the other at the bottom, are of cast-iron. At least one of the rollers is always of paper, as it has more elasticity than metal, and is not liable to warp, like wood. It consists of sheets of brown paper or pasteboard, densely packed and compressed on an iron axis. The edges of these form the surface of the roller, which is turned and polished, an operation of some difficulty.

Before the final rolling in the C. machine, the fabric is first lightly smoothed by passing over warm cylinders. Cotton goods are starched with a starch prepared from flour, and the starch is sometimes thickened with plaster of Paris, porcelain clay, or a mixture of these, to give a fictitious appearance of stoutness, which of course vanishes when the article is washed. For ordinary C. the fabric is then simply passed between plain cylinders, which produces the desired effect by flattening the otherwise round threads. When, by means of a hot cylinder, with a pattern raised upon it, the amount of this flattening is unequal on different parts of the cloth, the beautiful effect known as 'watering' is the result. *Glazing* is produced by combined rubbing and pressure; the rollers, one of which is heated, being made to move with different velocities, so that one side of the fabric is rubbed as well as pressed by the roller whose surface moves with the greater rapidity. Before the invention of these rubbing cylinders, glazing was effected by rubbing the surface of the fabric with a polished flint. Calendering is done on a very large scale in some manufacturing towns, such as Manchester and Glasgow. In Dundee, where half a century ago it was not the custom to calender the linen at all, there are now more than 1000 hands employed in this branch of industry. Machines similar in construction to the one above described, but with all the rollers of iron, and also called calenders, are used for rolling india-rubber into sheets for coats, shoes, &c.

CALENDERING is the term applied to the process of finishing by pressure the surface of linen, cotton, and other textile fabrics. It is usually done by passing the fabric between cylinders pressed together with great force; hence the origin of the term, which is a corruption of *cylindering*.

The familiar domestic processes of starching and ironing afford the simplest illustrations of the object and result of calendering. The domestic mangle effects the same object as the flat iron, and is a near approach in construction to the C. engines of the manufacturer, no traversing-box of stones being used in the new patent mangles.

The cylindrical C. machine is said to have been introduced into this country by the Huguenots, driven here by persecution. The cylinders were originally of wood, but the liability to warping is a strong objection to these.

The modern calender usually consists of four, five, or six cylinders or 'bowls' set vertically in a strong iron frame, with suitable driving gear, and furnished with weights suspended over a pulley to produce the required pressure. This sometimes amounts to, or even exceeds, 20 tons, including the weight of the rollers. In a five-roller machine, the arrangement is this: The centre roller is of iron or copper, made hollow for the admission of steam or a red-hot