CEMENT-MAKING APPLIANCES.

Particulars of Some of the Machinery Which is Helping the Industry to Grow.

Concrete machinery makes an interesting study. Labor-saving devices are as necessary in the cement and concrete industry as in any other commercial enterprise. The following article gives details of many of the appliances used in the manufacture of cement. We are indebted to the Ontario Minister of Mines for permission to reproduce these particulars from his report.

Washmills are usually built with concrete sides and bottom, and are circular, hexagonal or octagonal in form. The diameter is from eighteen to twenty feet, and the depth is about eight feet. There is an upright centre shaft having horizontal arms or spokes, which carry "drags," usually three in number. Washmills are employed for the preliminary mixing.

Of intermittent kilns, there are two types, the "bottle"

the archway floor. The Batchelor kilns are usually constructed in batteries of six, having a single stack to which all flues lead.

The Dietsch kiln is one of the continuous types. The "forewarmer" is really the lower part of the stack, there being here a shelf or ledge which prevents the mass of slurry bricks above from falling down. The coal is charged into the furnace from the floor beneath that from which the dried slurry is charged. The "drawing" is done from below, every four or six hours, and to replace the material thus drawn a fresh supply is dragged by hand from the ledge above referred to. The kiln is provided with suitable "ports" or "eyes" for firing and loosening the bricks when "hung up."

This mill is used at some factories for grinding the finished product. It consists of a steel ring, against the inside surface of which a heavy steel roll is made to revolve. This roll by centrifugal force exerts a pressure against the steel ring. Screens are provided so that the clinker when sufficiently ground can pass through, the coarser particles, however, falling back again to the mill. The heavy roll



Gates Ball Mill.

Ball mills are employed to do the coarser grinding of the clinker only. This is a cross section showing shields and screens.

kiln and the Batchelor. The former, as the name would indicate, is in vertical section, shaped somewhat like a bottle. The outer structure is built of brick or stone, and the lining, on account of the excessive heat to which it is exposed, is of fine clay. The fire is started on the grating below, and when well under way alternate layers of coke and dried slurry are laid in. When the burning is completed, and the clinker allowed to cool, it is "drawn." The processes of loading, firing and sorting the clinker all require considerable skill, and of a kind, too, wholly born of experience.

No attempt to utilize the waste heat from the firing chamber is made in the bottle kiln. This is done in the Batchelor kiln. If we conceive a long, covered archway, with a cement floor, annexed to the bottle kiln in such a way that the escaping gases are obliged to pass through it on their way to the stack, we have the principal of the Batchelor kiln. The slurry is pumped over this floor to a depth of a few inches, and while one charge is being clinkered in the furnace of the kiln a second is being dried on

above referred to is attached to an upright pendulum-like shaft.

The general scheme in the Alborg kiln is similar to that of the Dietsch kiln. There is, however, no ledge in the Alborg kiln. The narrowest portion of the kiln, or "throat," occurs where the coal is charged into the kiln. Above this, the slurry bricks part with their moisture, and below it the firing takes place. Below the firing zone the cooling occurs. No attempt is made to utilize the waste heat.

The rotary kiln is simply a huge revolving cylinder of boiler steel, set slightly on an incline. The lower end is closed by a "hood" mounted on wheels, so that it can be rolled back at pleasure. Through this hood passes the pipe which admits the fuel, usually ground coal. The fluid slurry is pumped in at the upper end. Rotary kilns have a capacity of about one hundred barrels per day, depending on the kind of slurry and the length of the kiln.

Ball mills are employed to do the coarser grinding of the clinker only. They are in the form of short