

For fuel—coal crushing is seldom necessary—this operation being performed only on bituminous coal used in iron and steel industries. Before being crushed the coal must be analyzed for the purpose of finding out what size it must be broken into in order to get rid of the impurities, and at the same time not decrease it too much in size. Different coals vary in regard to the amount of breakage necessary.

In crushing, the first purifying operation, most Canadian coal companies use the Bradford Ore-breaker. This breaker is a revolving, cylindrical vessel, suspended in a position not quite horizontal, along the inside of which are parallel projecting shelves. The coal is fed into it from the higher end. When the breaker revolves, the pure coal, striking the shelves, breaks up and passes through the parallel bars which form the walls of the machine; but the slate and pyrite, being harder, remain whole and are unable to pass through the sides. In this way the breaker is also a sizing machine. The inclination of the cylinder causes the impurities to slide towards the lower end, where they are ejected. Of course some of the refuse passes through the sides with the crushed coal and a further separation of these materials is effected by washing.

There are various types of washing apparatus. Those most commonly in use in Canada are the trough washer and the piston-jig systems. The former is a long trough slightly inclined, with riffles at regular distances along the bottom, down which a stream of water is driven. The crushed coal is fed at the upper end. The impurities, being heavy, drop to the bottom and are caught in the riffles which move up to the top of the trough, discharging their load over the end. The pure coal is carried along suspended in the water, to the lower end, whence it is discharged.

The piston-jig washer is a box filled with water, the bottom of which is shaped like an inverted pyramid. It is divided into two sections by a partition which reaches two-thirds of the way to the bottom. On one side of the partition is suspended a box-like screen or sieve, into which the unwashed coal is fed. On the other side of the partition is a plunger which moves up and down in the water. On the down stroke of the plunger, the water is forced up through the screen; on the up stroke it is sucked back. This pulsating movement is very rapid and the coal quickly stratifies. The pure coal rises quickly and drops slowly; the impurities rise slowly and drop back quickly. The