

thus makes the bed porous. However the third form, with the traveling grate, accomplishes combustion much more completely than the others.

The second way of using up the coal of the culm heaps has met with only partial success. The coal in an impalpable powder is blown into the combustion chamber. An ideal furnace for this purpose is one in which the fuel is kept suspended in the air until entirely consumed, and one from whose chimney no smoke issues. The original attempts to make furnaces of this sort failed. Such a furnace requires a very delicate and complex mechanism, and must execute rapid and complete combustion. Very few furnaces of this sort have been constructed.

The third way of using waste coal, which will doubtless prove to be the most serviceable of the three, consists, as said above, in mixing the fine coal with some binding material and compressing portions of the mixture into forms of suitable size and shape so that they may be used as ordinary coal. The forms thus made are called briquettes, and were first made in France. In fact nearly all of the methods for economy originated in the Old World, as it was there that the need of economy was first felt. Briquettes were made in France as early as the year 1594, but did not become of commercial importance until a few years before the middle of the century. The different substances, "binding materials," that may be used to mix with the coal are very numerous, and may be inert or combustible. The principal inert substances are,—clay, soap, plaster of Paris, hydraulic lime, slack lime, wood ashes, caustic soda, carbonate of soda sulphide of ammonia, sulphide of iron, sand, silicate of potash, furnace slag, black oxide of manganese, etc. The principle combustible substances that may be used are, bituminous coal slack, pitch, tar, asphalt, petroleum, dead oils from distillery petroleum, some one of the hydrocarbons, etc. Some attempts have been made to agglomerate the fine coal without a binding material, but have always proved