

—have been made in the plant. Among these are forms of dryers and heaters for use either with direct or steam heat; also alterations in the presses, which enable the compressed fuel to be turned out in the shape of an egg. “*Eggettes*” (as they are termed) and briquettes may be made in various sizes to suit requirements. Experience has proved in many instances that heat and compression are sufficient to produce briquettes without the use of pitch or other binding agent. Interested parties can try this without much expense or trouble by simply heating up a small amount of fine coal in a retort to as high a temperature as is possible short of ignition, and immediately subjecting the heated coal to very heavy pressure by a small hand or hydraulic press. Where coals will yield sufficient tarry matter themselves, the introduction of material to act as a binder or agglomerant is unnecessary, and the cost of production is somewhat reduced.

A totally different method of briquette-manufacture has recently been introduced by a German inventor. In this instance the fine coal is mixed with lime and water to the consistency of stiff mortar. It is then moulded into blocks under very slight pressure, the object being to produce a briquette of an open or spongy character, instead of the compact, dense article usually made. The fine coal and lime may be mixed dry if desired, and the water subsequently added, thus slaking the lime in the presence of the fuel material. For every ton of crushed coal about 2 cwt. of lime and 4 cwt. to 8 cwt. of water (the latter must be proportioned according as the coal is wet or dry) are used. After being moulded, the blocks or briquettes are dried in similar manner to slop-moulded bricks. If necessary for the purpose of promoting cohesion, a proportion of vegetable refuse, such as sawdust, fine shavings, moss, or straw-chaff, may be introduced. Where it is necessary to store this class of briquette out-of-doors hydraulic lime should be used, but ordinary lime is said to be good enough where storage is indoors, or where the briquettes will not be exposed to the weather otherwise than for a short time.

It is claimed that, owing to the admission of air being more easily effected, briquettes of this open or porous class are better suited to burning in places not under blast than those of a compact form; also that much less soot and smoke will be produced than where briquettes in which tar or pitch is incorporated as a binding agent is used. Experiments are said to have proved that the presence of lime has a tendency to promote combustion, and in all probability a chemical reaction of the lime will be found to be productive of beneficial results. The method appears very simple, and could be tried on a commercial scale at any brickyard where there is an ordinary machine for making common wire-cut bricks—in fact, such a machine seems peculiarly adapted to the purpose.

Another way in which fine coal and slack may be utilised is by grinding it to powder and blowing it (by means of a fan) into the furnaces of steam-boilers, &c. Experiments appear to have demonstrated that combustion is effected without waste or residuum, and it is claimed that the heat liberated is approximately one-third more, in the use of given quantities of coal, than that obtained by feeding the fires in the usual way. The “*Meldrum*” furnace, now largely adopted by steam-users in Great Britain, utilises as a fuel what, until the last few years, was regarded as waste material. In this case the fuel is fed on to the fire-bars either by hand or by a mechanical stoker, and forced draught is effected by means of steam-jets.

By the adoption of appliances of either of the foregoing forms, I am strongly of opinion that much of the refuse slack which (especially at brown-coal collieries) now goes entirely to waste could be profitably utilised.

Explosives used in Coal-mines.

For many years the only explosive used for blasting purposes in coal-mines was common blasting-powder. It was generally employed in a loose state for dry holes, or enclosed in a tarred cartridge-bag where the shot had to be fired in a damp or wet place. Regulations under the mining laws of Great Britain subsequently made it illegal to take powder underground except in the form of cartridges carried in a proper case or canister. This led to the introduction and very general use of cartridges formed of powder mixed with some suitable binding agent, and compressed into moulds of convenient size and shape. Powder has always been favourably regarded as a blasting agent by the coal-miner on account of its convenience, and his familiarity with its use and properties. Its slow rending action renders it more conducive to the production of lump coal than is the case with the quick and shattering action of most nitro-glycerine compounds. Of late years blasting-powder has largely fallen into disuse owing to the restrictions placed upon it by the increasing severity of mining regulations in the interests of safety.

There is no gainsaying the fact that many disastrous explosions in collieries have been due to the use of blasting-powder in fiery mines, and also in mines of a non-fiery character, but which are dry and dusty. The total abolition of blasting in mines which are fiery, or dry and dusty, or which may have these conditions combined, would in many instances mean cessation of operations owing to the great extra cost which would necessarily be entailed in getting the coal and making height for roadways without the aid of some blasting agent. The necessity of having some safe explosive for colliery-work is fully recognised, and only such explosives are now permitted to be used in collieries in the United Kingdom as fulfil the conditions imposed by the Secretary of State. These conditions are such as allow of the use of those explosives only which pass a standard test, and are not likely by their use in mines to cause an explosion of firedamp or coal-dust. The object sought by the manufacturers of these explosives is the prevention of flame under the ordinary conditions of blasting. Many of the compounds consist of nitrate of ammonium and di-nitro-benzol or naphthalene in suitable proportions; others are of nitro-glycerine combined with sulphate of magnesium, nitrate of barium, nitrate of potassium, &c., and infusorial earth.

In October last an order was issued by the Secretary of State (London) repealing previous orders in relation to the use of permitted explosives in Home collieries, and which re-enacted those orders with certain modifications and additions. The chief purpose of the order was to embody the