8. CLEANING CHIMNEY FLUES

For efficient and safe operation of heating apparatus it is extremely important that both the flue and the smoke passages in the heating device be free from soot. When bituminous coal is used for fuel, soot accumulates quite rapidly and frequent cleanings are necessary.

Accumulation of soot in a chimney introduces the risk of a chimney fire with the consequent danger of sparks being thrown upon the roof or penetrating cracks in the chimney walls. *This is a very great hazard and is the reason why chimneys should never be purposely burned out to clean them.* The burning out of a tile lined flue is liable to crack the lining.

A common and efficient method of cleaning a chimney is to sweep it with a properly weighted bundle of rags or a bush attached to a rope and worked from the top, but because this operation is troublesome, chimney cleaning is frequently neglected.

Other methods of chimney cleaning recommended as simple and efficient are as follows:

1. The U. S. Fuel Administration has strongly advocated the use of salt. The fire should be put in good condition with a substantial body of hot fuel. Then dried common salt is then scattered over the incandescent fuel in quantity depending upon the size of the furnace. For a household furnace, a pound at a time is ample. The dampers should be kept open to maintain the furnace temperature until the fumes entirely disappear. This usually takes about half an hour. The soot is disintegrated by the action of the salt fumes. Repeat the application as necessary.

This method is highly endorsed for cleaning boiler tubes and furnace passages. It does not interfere with the operation of the plant and neither brickwork nor metal is deteriorated.

It is known that a layer of tarry soot 1/16 in. thick on boiler tubes or furnace passages will decrease their heating efficiency 20 per cent, hence the necessity of keeping them clean. It is claimed that an occasional use of salt as described will keep both heating apparatus and flue free from soot.

2. An ex fire chief recommends firing a revolver loaded with one or two blank cartridges up a chimney flue to remove soot. He asserts it to be very effective and that no injury to the flue results. Precaution should be taken to shut off the flue opening or fireplace with an old blanket or piece of burlap to prevent the soot flying back into the room when it falls following the shot. This method requires that the fires be extinguished before it is applied.

3. Scrap zinc thrown on a hot fire is recommended as a soot remover. The zinc fumes are said to disintegrate the soot.

Zinc compounds are also sold for this purpose, but as several pounds of these zinc materials are recommended to be used at a time, they would be somewhat expensive.

9. EXTINGUISHING CHIMNEY FIRES

A handful or two of powdered sulphur thrown on a fire is claimed to be effective in extinguishing a soot fire in a chimney. It produces sulphur dioxide which extracts the oxygen from the air supply and so prevents combustion.

A few pounds of salt thrown in the flue at the top is an old and excellent remedy for a soot fire. Even a pail of sand, earth or ashes is helpful. Such materials, however, should be used with much care, if at all, when a fireplace connects with the chimney flue, for they would be liable to scatter the burning soot into the room where the fireplace is located.

HIGH TEMPERATURE DRYING

By Burt S. Harrison

BY popular usage the term Drying may include desiccation, dehydration, distillation, concentration, oxidation, baking, calcining, chemical actions due to heat, catalytic actions due to heat and the presence of a catalyzer agent, and in fact numerous processes which have no other connection with actual drying than that incidentally there may be some moisture present on the start which is quickly driven off by the heat.

Even the term "high temperature" is purely relative. A temperature of 200 deg. fahr. is high temperature in a process where for 100 years or more the standard of temperature has been from 120 to 140 deg. fahr.

On the other hand, in one instance, where producer gas of 120 B.t.u. value was being burned in a brick oven with a temperature of combustion of 1900 deg., we heated the air for combustion and the gas separately to 1000 deg. fahr., and then burned them with a resultant temperature of combustion of 3100 deg. fahr., as shown by Seger cones and the Wilson-Maeulin platinum-rhodium couple. The first step—the heating of the gas and air to 1000 deg., comes under the heading of high temperature heating; the second step—the burning at 3100 deg.—comes under the head of high temperature combustion.

The range from 200 to 1000 deg. is what we term *High Temperature Work* as applied to commercial drying or processing.

It is a well known fact that if a pound of coal is burned free in a large room, the combustion will be very slow, if indeed it does not cease altogether, though the volume of oxygen in the room is ample for the purpose. On the other hand, if the coal be confined in a small chamber and the same volume of air be passed rapidly over it in a thin stream, the combustion will be very rapid. The rate of combustion will depend directly upon the rate of oxygen supply to the flame, the rate of heat absorption of the fuel and inversely upon the heat radiation loss from the fire.

Oxidation is only slow combustion; therefore the same rule holds. In other words, oxidation in an oven depends upon temperature and actual contact with the surface of the materials. Without that contact, it will be only by the slow and uncertain process of diffusion that the oxygen can reach the material. It is analogous to the New Yorker who needs coal and knows that there is plenty at the mines, but because that supply