

plants, it is good practice to check the effectiveness of the venting devices and if necessary, replace them with more effective ones that will prevent the return of air into the heating system, and also to check the tightness of the piping.

On account of the ease and effectiveness with which the fuel can be controlled, gas-burning appliances are particularly adaptable to full automatic control. Standard equipment on a steam boiler generally includes provision for control through a room temperature thermostat, a steam pressure regulator and either a device by means of which the water in the boiler is automatically maintained at the proper level or a device which shuts off the gas in the event that the water level becomes too low. Practically all gas boilers are or may be equipped with automatic safety pilots which shut off the gas if the pilot flame is too low.

Water boilers are adapted to operation under thermostatic room temperature control and are also provided with water temperature control equipment. Warm air furnaces can be under the control of thermostats in the spaces being heated, as well as thermostats located in the heat ducts for the purpose of preventing unpleasantly hot air reaching the heated spaces. Variations in the pressure under which the gas is supplied to the appliance are controlled by means of a gas-pressure regulator. This is a standard part of practically all makes of gas-burning heating appliances.

CROSS-CONNECTING COAL AND GAS BOILERS

Frequently, when a customer already has a coal boiler in his home, it is expedient to leave the coal boiler in place, and to cross-connect the gas boiler with it. Where gas heating is new to the community, it produces a more secure feeling in the customer's mind when putting in gas-fired house-heating equipment, if he knows that he can burn coal at any time he may desire.

For steam or vapor installations, it is desirable to have the water line in both boilers at the same level so that if desired the gas boiler may automatically take up the load if the fire in the coal boiler goes out.

CHIMNEYS

See Chapter 14 and the material relating to gas appliance chimneys contained therein.

Chapter 18

SPECIAL SOURCES OF HEAT

Part I. Exhaust Steam

Adjustment between Heating Loads and Exhaust Steam; Heating Load and Amount of Exhaust Steam Available; Procedure for Making Analysis.

WHERE heat and power or electric current are required, steam may first be used for generating the power or electric current and the exhaust from the generating units then used for heating. Likewise in many industrial processes requiring heat at certain temperatures, steam may first be passed through engines or turbines, for generating any power or electric current required and used for the processes at the pressure required to give the desired temperature.

The exhaust steam may be circulated directly through the radiators, heaters, air heaters, humidifiers or other elements of a heating, or of a heating and ventilating system or it may be used for heating water which in turn may be circulated through similar elements of a hot water heating system. It may also be used for domestic hot water heating.

Frequently there is a fluctuating load on the power or electric generating apparatus which in turn produces fluctuating quantities of exhaust steam. The quantity of steam required for heating is also variable. These two variables do not, as a rule, coincide so that the total quantity of exhaust steam produced may be either a certain percentage less or a certain percentage more than the total quantity of steam required for heating, or for heating and ventilating either during the heating season or throughout the year. These relations change throughout the day and night and throughout the seasons of the year.

There are also wide variations in the heating requirements due to changes in weather conditions and wide variations in the exhaust produced due to such changes as in the demands for lighting on dark or light days, for elevator power during rush or slack periods, for air conditioning on good or bad days and for many other variables in the demands for power or light, depending on the character of building and its operating requirements.

ADJUSTMENT BETWEEN HEATING LOADS AND EXHAUST STEAM

The way in which the quantities of exhaust steam produced and the quantities of steam required during the various intervals of time through-