

is required. The extent of this cooling depends on the outside temperature and on how many people are in the seats.

There are in successful theater air conditioning plants many thermostats, valves and dampers, all supplemented by expert manual supervision. The air conditioning apparatus involves refrigeration as well as heating, and is within the province of the thermal engineer. It is no field in which amateurs should practice.

GREENHOUSE HEATING

Heat control in greenhouse heating is practically the fundamental basis of the industry. Without some form of adequate thermostatic control, the man-hours required to maintain the rather exacting temperatures demanded by the growing of plants and flowers under glass would involve a prohibitive cost.

The system of heating employed is not in itself vitally important, although it is desirable to use a heating medium having a low temperature when the demands for heat are low. This assists materially in coordinating the artificial heat with the sun heat, that is, the temperature

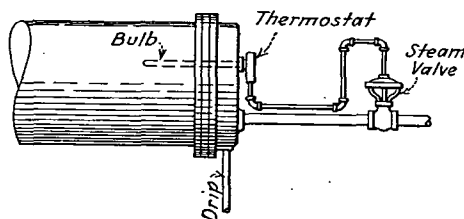


FIG. 9. THERMOSTAT ON STORAGE WATER HEATER

regulators can handle the artificial heat more exactly if the temperature in the radiation is not greatly above that required to maintain the correct temperatures in the spaces to be heated.

Sectional or zone heating should be employed in greenhouse work to a great degree, both with automatic control and with manual control. An experienced greenhouse engineer would divide the heating units in any given space into at least ten separate elements so that each kind of growing thing which may at various times be placed there can be given optimum conditions regardless of those out of doors.

In an industry where quality of product carries so much weight and where the ultimate purchaser usually is willing to pay for that distinctive quality, the cost of heat control to secure such quality is a minor consideration. (See Chapter 31, Special Heating and Ventilating Applications).

SWIMMING POOL HEATING

Swimming pools, to be acceptable in every way, require a considerable amount of heat, and while the temperature control need not be fine enough to split degrees, and while there are several ways of supplying the heat, a controlled supply of it must be maintained.

CHAPTER 17—AUTOMATIC HEAT CONTROL

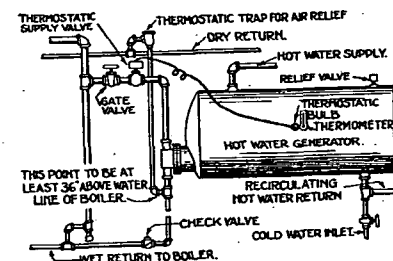


FIG. 10. CONNECTING HOT WATER GENERATOR TO LOW PRESSURE GRAVITY RETURN SYSTEM SHOWING AUTOMATIC CONTROL

The water in the pool may be circulated by means of a pump through a heat transfer tank in which it makes contact with correctly controlled hot surfaces such as steam coils.

The injection of steam directly into the water through a circulating arrangement may meet the requirement at a considerably lower cost for equipment and this can be controlled exactly.

When a directly-fired heater is used the draft dampers can be controlled automatically.

DOMESTIC HOT WATER HEATING

This is a class of heating as universal as that of house heating. Automatic control of the hot-water temperature as it leaves the heater is very essential to economy and to freedom from danger of scalding the bodies of the users of the water.

Domestic hot water must not reach steaming temperatures as these put a severe strain on the piping system and are very destructive to valves and valve packings. Every degree of excessive domestic hot-water temperature means wasted fuel.

When the water is heated with an individual heater, as for instance a small boiler with an automatic fuel burner, the thermostat in the supply or storage tank may control the burner direct. If the water is heated from a steam coil, the thermostat controls a valve which regulates the

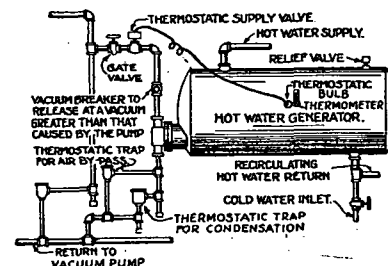


FIG. 11. CONNECTING HOT WATER GENERATOR TO VACUUM PUMP SYSTEM SHOWING AUTOMATIC CONTROL