

C. A. Dunham Company

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C. A. Dunham Co., Ltd.,
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The accumulated experience of the entire Dunham Organization is put at the disposal of the Heating Ventilating and Air Conditioning Engineer. This cooperation is available for *Modernization Work*, as well as for new construction in industrial, commercial, housing and other projects.

"Dunham Heating Service" in local classified telephone directory in all principal cities.

Human comfort is assured in buildings heated by the Dunham Sub-atmospheric Steam Heating System because desirable temperatures are maintained throughout the building by automatic control of both steam temperature and steam volume to meet all weather changes.

The system is a simple two-pipe system in which all the essentials of circulation, distribution and control are co-ordinated. Balance of heat input with heat loss from the building resulting from variation of pressure are the fundamentals of the Sub-atmospheric System. Control of the temperature of the steam in the radiators is accomplished by controlling the pressure or vacuum of the steam in the supply piping and radiators.

The Dunham Sub-atmospheric System distributes a varying supply of heat equally, automatically and continuously through the heated space. Desirable building temperatures are automatically maintained under varying weather conditions. A positive *continuous* circulation is maintained as a fundamental function of the system. This maintains unusually constant temperature levels throughout the building. At a control station which may be located in the boiler room, remote readings of building temperatures and operating conditions may be taken.

***The Control is fully automatic.** Beginning with a maximum radiator heat-output obtained by steam circulation at a pressure of 2 pounds and a temperature of 218 F or more as required, the output is progressively reduced according to the demands of the weather, by a reduction in the *rate* of steam admission to the system, which automatically causes a reduction in steam pressure and temperature so that steam may be circulated at varying temperatures down to about 133 F.

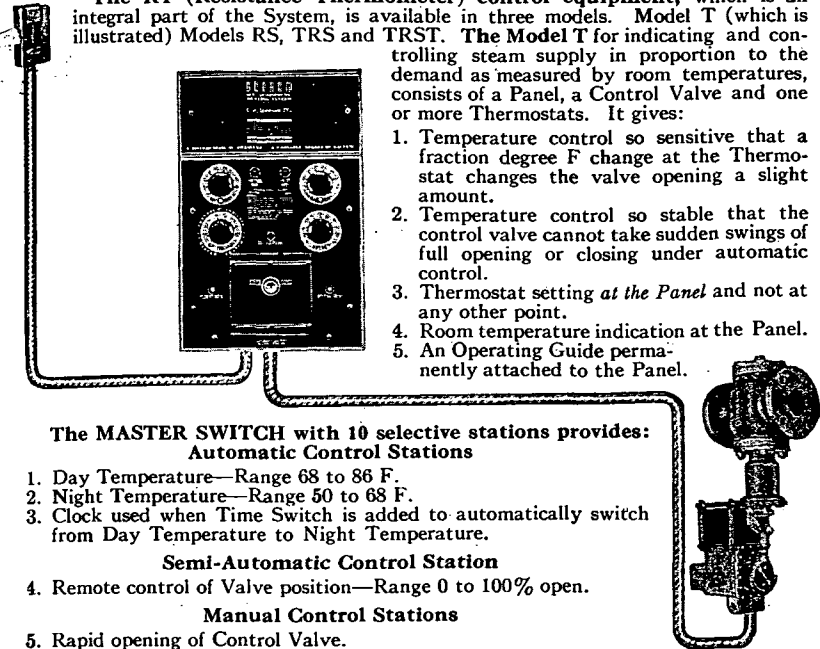
*Can also be installed for manual control.

Further reduction in heat-output is obtained by partial filling of radiators with sub-atmospheric steam until the point is reached at which the need for heat ceases and the supply of steam is completely shut off.

Measuring Heat Demand. The demand for heat is measured by the resistance thermometer principle. Resistance thermometers measure and indicate temperatures or temperature changes, they are uniquely sensitive, accurate and long lived, *operating without moving parts or wear*. Variations in temperature at control points create variations in electrical resistance in control circuits. The supply of heat is varied with the demand by using these variations in electrical resistance through Wheatstone Bridge circuits to actuate the control valve which governs steam supply. The distribution of the steam supply is automatically maintained under all variations in supply by the coordinated functioning of the Traps, Pump, Differential Controller and Regulating Orifices at radiator inlets.

The RT (Resistance Thermometer) control equipment, which is an integral part of the System, is available in three models. Model T (which is illustrated) Models RS, TRS and TRST. The Model T for indicating and controlling steam supply in proportion to the demand as measured by room temperatures, consists of a Panel, a Control Valve and one or more Thermostats. It gives:

1. Temperature control so sensitive that a fraction degree F change at the Thermostat changes the valve opening a slight amount.
2. Temperature control so stable that the control valve cannot take sudden swings of full opening or closing under automatic control.
3. Thermostat setting *at the Panel* and not at any other point.
4. Room temperature indication at the Panel.
5. An Operating Guide permanently attached to the Panel.



The MASTER SWITCH with 10 selective stations provides:
Automatic Control Stations

1. Day Temperature—Range 68 to 86 F.
2. Night Temperature—Range 50 to 68 F.
3. Clock used when Time Switch is added to automatically switch from Day Temperature to Night Temperature.

Semi-Automatic Control Station

4. Remote control of Valve position—Range 0 to 100% open.

Manual Control Stations

5. Rapid opening of Control Valve.
6. Rapid closing of Control Valve.

Indicating Stations

7. Room temperature—Upper Range 68 to 86 F.
8. Room temperature—Lower Range 50 to 68 F.
9. Valve Position—Range 0 to 100% of full open.
10. "Off" Station—All control and indicating functions discontinued.

Model RS for indicating and controlling steam supply with balance between the demand as measured by the Selector (window thermostat) and supply as measured by the Heat Balancer (heat-rate thermostat) consists of a Panel, a Control Valve, a Selector and a Heat Balancer.

Models TRS and TRST for indicating and controlling steam supply in proportion to the demand as measured by room temperatures within the limits established by Heat Balancer and Selector, consist of a Panel, a Selector, a Heat Balancer and one or more room Thermostats. These are the only controls on the market that provide fully automatic control in response to the effect of outside weather and to building heat loss.

TWO OTHER OUTSTANDING PRODUCTS

Temperator A compact, efficient and attractive all purpose Heating and Cooling Unit for the home, store or office. Whether for winter or summer service or both the Temperator may be installed with access to outside atmosphere. In winter service this unit may be used with sub-atmospheric heating or with pressure steam or hot water system, providing clean, properly warmed and correctly humidified air with quiet air movement. In summer service instead of adding heat and

humidity it dehumidifies and cools. The change from heating to cooling is made by switching from a boiler connection to a chilled water supply or a refrigerating unit which may be at a remote point.

Sav-T-heat System (using gas fuel). A practical, efficient and economical method of residential heating and air conditioning. May be installed as an air conditioning system, as a vapor radiator system, as a hot water system or a combination of these.