

shield was satisfactory as the condensation rate was decreased by 11 per cent, the temperatures above the breathing line were reduced, the breathing-line temperature was unchanged, and slightly higher temperatures were obtained below the breathing line. The effect of a cloth cover (Fig. 4) extending downward 6 in. from the top of the heating unit was to make the performance unsatisfactory and inadequate.

Specially-Designed Heating Units³

Although any standard heating unit (*i.e.*, radiator) may be concealed in a cabinet or other enclosure so that heat is conveyed to the room only by the process of convection, the best results are obtained where units of special design are used. Figs. 5 and 6 show typical cabinet and wall convectors using specially-designed heating units. These units usually consist of a relatively large amount of extended surface which may be integral with the core or prime surface containing the heating medium or assembled over such a core, making thermal contact by pressure, or by

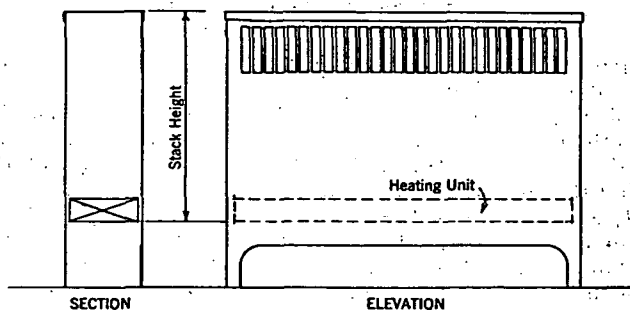


FIG. 5. TYPICAL FLOOR-TYPE CABINET CONVECTOR USING SPECIALLY DESIGNED HEATING UNIT

being soldered to the core, or by both pressure and soldering. (See Fig. 7). The ratio between the extended surface and prime surface may be as high as 25 to 1. The design and performance of enclosures should be carefully studied when heating units are to be selected for use with enclosures or when enclosures are to be applied to existing radiators.

OUTPUT OF WALL OR CABINET CONVECTORS

It has been the practice to state the output of direct radiators in terms of the *equivalent square foot* of heating surface. (See Chapter 6, Radiators, p. 97). With the development of convection-type heating units (extended surface units) the same procedure has been followed. However, an extended surface heating unit is entirely different structurally and physically from that of a direct radiator and since it has no physical measurement corresponding to the square foot of heating surface of a direct radiator, many engineers believe that heating units of this type should be rated in Btu output, rather than in equivalent square feet of heating surface.

³Specially designed heating units enclosed in a cabinet or wall have been commercially known as *concealed radiation*.

Convection-type heating units usually maintain room temperatures equivalent to those produced by exposed heating units with less steam consumption. This characteristic of the performance of convection-type heating units has been termed *heating effect*. Heating effect is attributed to (1) the minimization of radiant emission (2), the fact that the air which passes upward through a convection-type heating unit is drawn by gravity from the coolest strata in the room, *i.e.*, that at the floor level and (3) the heated air emitted from the air outlet of the enclosure is generally projected out into the room instead of rising directly to the ceiling.

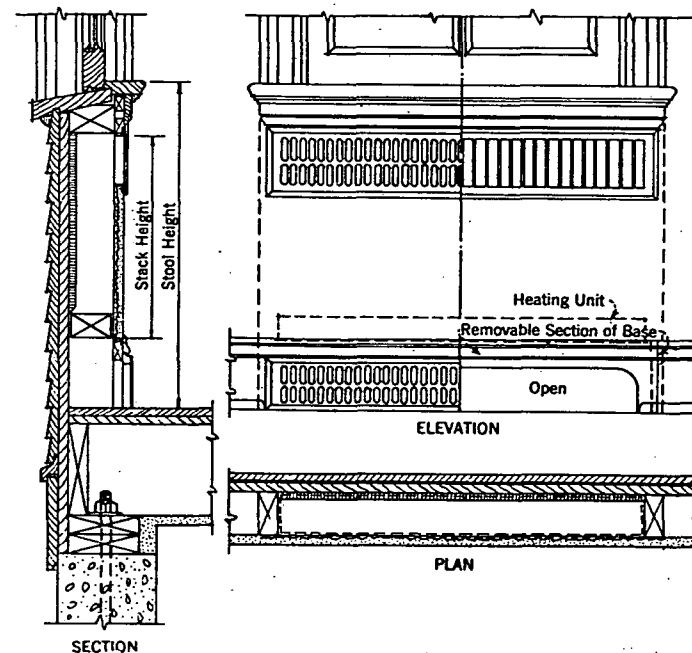


FIG. 6. TYPICAL WALL CONVECTOR USING SPECIALLY DESIGNED HEATING UNIT

Convectors of the cabinet or concealed type are usually sold complete as a unit including the cabinet and heating unit. As recommended in the A.S.H.V.E. Code for Testing and Rating Concealed Gravity Type Radiation⁴, the heat emission or output of concealed heating units for steam should be stated in Btu per hour, but may also be expressed in terms of equivalent heating surface (E.D.R.) which is equal to the heat output for standard conditions divided by 240. For hot water the output may be expressed in Btu per hour and complete performance data should be given. The friction pressure drop through the heating unit, expressed in inches of water, should also be specified.

⁴See *Heating, Piping and Air Conditioning*, August, 1931.