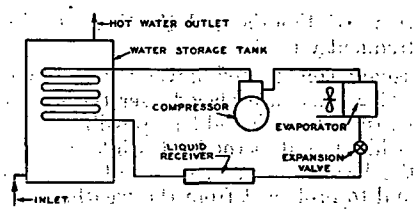

FIG. 14. HEAT PUMP ARRANGEMENT FOR HOT WATER SUPPLY

high water temperatures are desired. This is due to the fact that higher water outlet temperatures result in lower coefficients of performance.

For coefficients of performance of 4 or higher, the heat pump water heater may be more economical to operate than a conventional water heater.

Although the first cost of domestic hot water heat pumps is somewhat high, they have the advantages of eliminating products of combustion, odors and soot, and not needing a chimney. A further advantage is that they may be used for cooling purposes. With a coefficient of performance of $2\frac{1}{2}$ to 3, water temperatures of 140 to 150 F may be obtained.[5]

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CHAPTER 50

RESIDENTIAL SUMMER AIR CONDITIONING

Consumer Requirements, Equipment Capacity Selection, Types of Equipment, Types of Application, Central Systems for Summer, Central Systems for Heating and Cooling, Location of Cooling Equipment, Noise, Air Distribution Methods, Operating Costs, Effects on Future House Design

IN RECENT years, summer air conditioning in residences has developed to the stage where it has become a major factor in the air conditioning field and has created a heavy interest among home-owners, builders, architects and business men. Residential cooling, particularly for the small home, received its initial impetus when equipment specifically designed for such purposes became available in the 1930's. Recently it has caught the public fancy resulting in a tremendous increase in the number of sales and installations.

The first installations were made by using the commercial and industrial methods as the estimating basis and did not prove as satisfactory as the installer or designer desired. Actually, the difference between estimating the residential summer air conditioning and commercial summer air conditioning loads is in the design temperature differences used, the type of internal load in the conditioned area, and the method of calculating equipment size.

CONSUMER REQUIREMENTS

With cooling, as with heating, the requirements of the individual customer are the foremost consideration. Present practice is to design residential summer air conditioning on the basis of an 80 F indoor temperature. Design on this basis will permit the home owner to maintain somewhat lower temperatures during most of the cooling season, by maintaining a thermostat setting of 75 or 76 F. During the heat of the day on a design day the temperature may rise to the design temperature. This method of design utilizes the thermal storage effect of the house and household furnishings to level out the short duration peaks. Analog computer studies substantiated by extensive field investigation[1] have proven the adequacy of this equipment selection procedure.

The preference of individual home owners, however, may dictate the occasional use of indoor design temperatures below 80 F. Oversizing leads to several objectionable operating characteristics to be discussed later.

To insure comfort, it is essential that the proposed operation and performance of the system be explained to the user in advance. Usually the greatest degree of comfort can be obtained by keeping the house closed and operating with a fixed thermostat setting throughout the cooling season. In some climates the opening of the house to utilize *night air cooling* creates humidity difficulties that take several hours to overcome during the following day. The use of *night air cooling* may lead to unsatisfactory conditions when the equipment is not turned on again sufficiently early the next day. It will also allow unfiltered air to enter the house thus reducing the cleanliness advantage of air conditioning.