

WHY RADIANT HEAT IS USED

Some Factors In Choosing Type of Heat

Methods of heating homes are being worked out that soon may make the basement furnace look as antique as a pot-bellied stove.

Some of these methods are proving practicable in certain areas. Others are still in the experimental stage. The result is that the prudent home builder will consult his local heating contractor for the best tried-and-true plant and let his neighbor's house serve as a guinea pig for science.

However, the things being done are interesting to review.

Heated wallpaper, operating on the electric blanket principle, has been found practicable in England. It forms a ceiling of radiant heat that sends rays down in the manner of the sun.

A similar system has been devised in this country without any heating coils, but employing sheets of carbon-impregnated rubber as a continuous electric conductor. These sheets are nailed directly to ceiling joists and covered with paint or wallpaper, or a thin coat of plaster.

Radiant glass heating panels under windows and elsewhere in walls in place of conventional radiators also operate electrically. The glass covers an aluminum heat reflector plate.

While electricity is considered an ideal energy for house heating, it can be used expediently only in low rate areas.

A new means of employing electricity is the heat pump. This contrivance reverses the process of refrigeration, extracting heat from the earth below the frost line, and using it to heat an entire house. In summer the pump can be reversed to cool the house.

Noteworthy experiments have been made with solar heat by researchers at the University of Colorado, Purdue university and the Massachusetts Institute of Technology. But so far all attempts to utilize the sun's energy have been to supplement standard heating systems, rather than to replace them.

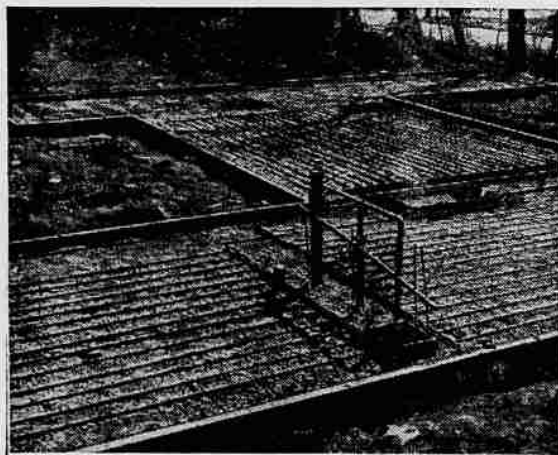
That rapid changes in heating systems will come in the future seems more than likely because of the changing fuel picture. Coal, long the leader because of its low price, has changed in cost through higher wages for miners and higher freight rates. Oil reaped no advantage from coal's troubles, for after the wartime shortage the uncertainty of future oil supplies has cast a shadow over this fuel.

Gas, in natural gas regions, has approached the ideal in fuels, but in spite of pipelines the increased demand for it in sudden cold spells has caused some anxiety. Manufactured gas, despite its higher cost, enjoys an advantage of negligible service costs over other heating plants.

Recently steps have been taken to burn coal in the mines to create gas. The Bureau of Mines has experimented along this line in Alabama. The Pittsburgh Consolidation Coal Co., and the Standard Oil Co., started a chemical project to convert coal at the mine into both gas and oil.

For standard fuels, however, heating plants are available in a wide range of types. For small "economy" houses, gas or oil fired floor furnaces without ducts are both inexpensive and popular. For regular installations, radiant hot water heating has captured the limelight.

Baseboard heating is one of the latest forms of radiation. These units replace radiators and baseboards in a room. One type presents a solid cast iron



RADIANT HEATING pipes are laid on gravel under concrete.

face that works entirely on the radiant principle. Another combines radiation and convection—heat through air circulation—with slots at the bottom and top edges.

The most common forms of all radiant heating employ circulating hot water. Warm air is now being used in some instances. Air ducts around the perimeter of a concrete slab, are equipped with registers for quick heating. Then the registers are shut off and heat through the slab is relied upon.

In the northwest, electric cable has been found feasible for heating floors, walls or ceilings.

Convertible furnaces are now being made, readily adaptable for coal, oil or gas.

Plan Now for Your Future Needs

Persons building new houses frequently can save money by installing electricity systems which are larger than necessary, says American Builder magazine.

The magazine points out that the number of electrical devices used in homes is expected to increase in future years. Even now, lighting represents only a fraction of the electricity which is ordinarily consumed in a modern dwelling.

"It is a comparatively simple matter to install outlets when a house is under construction, but it is often difficult to add outlets after the home has been completed," American Builder explains.

Tile Wins New Favor In the Modern Home

"It's pretty but what does it do?"

This is the question being asked more and more by budget-wise home-buyers—and a good question, too.

When it comes to clay tile, this question brings out one of the long term savings in home building that can't be measured in original outlay. Tile offers a long lasting finish. It is a material that has been in use for some 7,000 years.

Until a few years ago, tile in American homes was used primarily in bathrooms and kitchens. In the modern homes it can be found in many rooms—even dining room floors and floors of patios and porches.

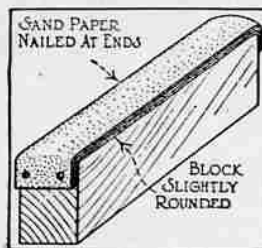
Clay tile is now made in an almost infinite variety of designs and colors. Mother goose and animal cracker patterns are available for children's rooms and table tops. Wallpaper designs can be used in bathrooms. Decorated panels forming mosaic pictures can be set in kitchen walls. Old Dutch designs are reproduced for fireplace borders.

You can now have tile handpainted and custom made for your fireplace facings, mural panels or other uses. Warner Prins, New York artist, points out that such tiles are originals and fit in with other objects of modern art in the home. They are painted so that the metal oxides flow in true ceramic fashion and penetrate the pores of the clay body. Then a natural glaze unifies the work.

The artist has carried made-to-order designs into terracotta plaques for patios and hall murals with paintings under weatherproof glazes. These plaques are made in large sizes up to 40-inch squares.

Floor tiles of the faience type are being made commercially in large oversize squares with a highly glazed iridescent finish in deep colors.

The lack of any need for maintenance is one of the virtues of tile.



Time-Saving Tip For Sand Paper Job

Searching for a new piece of sand paper and fastening it to a block can be a time-wasting nuisance. Select a block of the desired shape and size, round the edges and then place about a dozen strips of sand paper over the face of the block, nailing the ends to the ends of the block. When one strip wears out it can be quickly torn off, bringing a fresh stripe into position.

To give pastry a lovely golden-brown color brush the top with cream before baking; this is particularly attractive for a lattice-work pastry topping of a berry pie.

Tiny pieces of semi-sweet chocolate may be added to meringue-type cookies made with egg white, sugar, salt and vanilla.

Some green vegetables are higher in nutrients than others, but the green color of the vegetables usually denotes a plentiful supply of vitamin A.

Uniform Temperature Is Goal of Engineers

Radiant heating has become one of the most popular as well as one of the most popularly misunderstood heating systems for modern homes.

It has made the basementless house, built on a concrete slab, practicable for northern climates. Its glamor has captured imagination and at the same time has stirred up a lot of needless worries.

Some people think radiant heating is a mysterious newly discovered force like atomic energy, while others fear it is a builder's contrivance to give the unwary home buyer the hot foot.

Actually, radiant heating is merely a logical application of a heating system as old as the sun's. The basic idea is to send heat waves to your body and all other objects in a room without depending on warming and circulating the air.

One of its advantages is an almost uniform temperature from floor to ceiling, instead of a difference of 10 to 14 degrees with a layer of warm air for breather and cooler air along the floor. It permits children to play on the floor, safe from drafts. The heat, being mild, does not dry out the air and the absence of air currents prevents the concentration of dust on curtains or walls and ceilings above heat outlets.

Worry about a hot floor from properly installed radiant hot water coils is entirely groundless. To maintain room temperatures at 68 degrees, the surface of a floor will be 85 degrees, which is only about the same temperature as the surface of the human body.

The most common form of radiant heating installation is a coil of hot water pipes in the floor. But there are ceiling installations of pipe coils or electric pads, and wall units in the form of electrically heated glass panels.

Because of the economy of basementless, concrete slab construction, the greatest number of installations have been in floors with the coil embedded in the concrete. This system can be used under wood floors of either double or single construction, with more piping and slightly higher water temperatures to overcome the insulating quality of wood.

Ceiling radiation and wall installations result in virtually the same uniformity of heat for the average room as that obtained from floor systems. For example, a concrete floor installation under light covering, such as asphalt tile, and carrying a water temperature between 120 and 140 degrees, will produce a general room temperature of 68. The surface of the floor will be 85; the air temperature along the floor will be 70; six inches above the floor will register 69; at head and shoulder level it will be 68, and under the ceiling it will be only 68.5 degrees.

Engineers who have made these tests found that an installation under the plaster of a ceiling will produce a ceiling surface temperature of 110, but the air temperature under that ceiling will be only 69; at head and shoulder level it will be 68 and at floor it will be 68.

A thermal wall panel with an unpolished irregular surface will give off rays at all angles, and they will be reflected from other surfaces in the room. The result has been found to be 69 at the ceiling, 67 at the floor and 68 at head and shoulder level. In addition a temperature of about 72 rises up the wall from the panel because of convection—circulation of air stirred up by the heated panel. It has been found that about 40 per cent to 50 per cent of the total heat given off by wall panels is in the form of convection. However, this rising warm air cancels heat loss through a ceiling.

Ceiling systems cost a little more in hot water installation, because more pipe is required. Ceiling water temperatures are usually kept to 130 or less to minimize dehydration of plaster. Ceiling rays are more like sunlight, but a disadvantage is that anyone sitting at a table or desk has his legs and feet shaded from the rays, while his head and shoulders receive the direct shower.

Floor coils under wood also call for higher water temperatures—virtually the same as for hot water supply, 180 degrees. Heavy carpeting and felt pads on concrete also require warmer water—more than 140 degrees.

One of the disadvantages of radiant hot water heat in general is the time lag involved in warming up a house. This may be noticed especially in changeable seasons, spring and fall. Users of radiant heat say they anticipate general temperature changes by listening to radio forecasts and adjusting their thermostats ahead of time. But every hot water radiator system also involves a certain time lag over direct warm air circulation.

Another worry of prospective home buyers is whether the pipes will clog or leak and require a complicated breaking up of the concrete foundation of a house in order to make repairs. The use of this system is less than 15 years old, and so experience is incomplete. Pipe manufacturers, however, recommend only the use of tubing that is known to be resistant to corrosion. Also the fact that the water never boils should augur against lime deposits, and since it is seldom replaced it should involve a minimum of oxidation.

The safest guarantee, as with the installation of any heating system, is to have the work done by the best heating contractor you can get. Proper insulation around the edges of concrete slabs is highly important. Heat loss under a floor is so negligible that additional insulation under the concrete has been found to make very little difference. But the edges are the vital points. Insulation between the slab and the outside foundation footings should extend down from 18 to 24 inches.

Any kind of floor covering can be used, but should be planned for along with the installation of floor coils. Variations in the insulating values of floor coverings should be taken into consideration. For concrete slabs, asphalt tile has been the most widely used because of its durability, variety of colors and ease of cleaning. However, carpet can be laid directly on the concrete.

The same boiler can be used for hot water supply and radiant heating through the use of mixing valves to give lower temperatures for the heating coils. Different temperatures can be obtained for various rooms by the use of balance valves.