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HOT AIR FURNACES.

By A. G. KING.

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The original type of hot air furnace was nothing more than a large stove enclosed in a brick chamber, taking its air supply from the cellar or basement room in which it was placed. Much has been said and written against hot air furnaces. For instance, it is said that they heat only certain portions of a building, and that you cannot force the heat toward the windward side of the building; also that the fresh air supply is brought in contact with the red hot iron and devitalized, thereby destroying all its health-giving properties.

There is no doubt but that there are many residences and other buildings which, from their conditions of exposure, can never be successfully warmed with a furnace. On the other hand, it is equally true that there are thousands of residences and buildings which may be heated by a furnace in a satisfactory manner.

There is a feature of furnace heating we wish to make particularly plain to all our readers, both architects and builders, and that is, it is the furnace man and not the furnace who must be charged with many of the faults so common in a hot air heating apparatus.

First.—Let us say that 90 per cent. of all furnaces as to-day installed are too small for the work required of them.

Second.—The majority of furnaces are located with a view to cheapening the cost of installation, without any sane idea as to the results to be obtained.

Third.—At the present time furnaces are installed principally because of cheapness, and it is this feature which makes them dangerous. It is much better to pay 50 per cent. more for a furnace job and have it properly installed, getting all the good possible from the system.

Where a furnace is to be installed, the architect should provide a smoke flue well towards the exposed end of the building, that is, the end of the building most affected by the wintry winds. The writer has noticed rows of houses, hundreds of them, built for renting or speculative purposes, where the flue to be used for the furnace was located at the centre of the parlor or front room, no matter what the location of the room was as regards exposure or the points of the compass. Plainly then, this portion of the work is largely the fault of the architect.

The blunder of installing a furnace too small to do the work properly may be chargeable not only to the furnace man, but to the manufacturer as well. After a comparison of the catalogues of a number of prominent manufacturers in this line, we have selected the following as a fair representation of the ratings of their goods:—

Size.	Diameter of grate.	Capacity.
A	18 inches	15,000 cubic feet of space.
B	20 "	20,000 "
C	22 "	30,000 "
D	24 "	48,000 "
E	26 "	70,000 "

"The above is for winter temperature and for a single room. Where the space is divided into several rooms, deduct about one-third from capacity given."

Notwithstanding that the above is taken from the

catalogue of a manufacturer of a high grade cast iron furnace, we believe that the ratings as given should be reduced one-third for the best results. A bit of personal testimony will illustrate this and prove interesting to our readers.

For a term of years the writer lived in a medium sized city residence, one of a pair built on the "twin" order. Before renting and while examining the property we saw that the furnace was entirely inadequate to properly heat the rooms. The owner of the property agreed to install a new furnace and sent his furnace man to me with instructions to "fix it up" to my satisfaction. There was a trifle more than 9,000 cubic feet of space to be heated.

The furnace man looked the property over, made several memoranda in his notebook, and, as he was about to leave, remarked that he would have the new furnace in the next day. When I insisted on knowing the size, he referred to a catalogue and indicated a furnace with a net rating of 15,000 cubic feet. I told him without hesitation that I desired the next larger size. He was disposed to argue the question, but finally agreed to put in the larger one, or a furnace rated to heat 20,000 cubic feet of space.

Now as to results. My neighbors in similar sized houses, but with small furnaces, burned an average of eight, eight and a half and nine tons of coal the next three winters, while my coal consumption averaged four, four and one-half and five tons for the same period, notwithstanding the fact that no ashes were sifted and no particular attention given to the furnace. Thus was a saving of \$30.00 yearly effected on the fuel bill.

It seems quite probable that the furnace man does not always take into consideration the heat losses through windows, walls and doors, which may more than equal the amount of heat necessary to warm the cubic feet of air in the building. We look at one square foot of glass (window), twenty square feet of outside or exposed wall, and two hundred feet of air space, as being about equal, when figuring cooling surfaces or heat losses, and estimate the size of furnace accordingly. It is only by an intelligent inspection of the building to be heated that the proper size of furnace may be selected.

Another matter to which we wish to call the attention of our readers is the method of taking air to the furnace. The furnace should sit over a carefully built pit of brick laid in cement, and the fresh air should be brought to this pit through a tile conduit with carefully cemented joints. It is a lamentable fact that in many localities more than 75 per cent. of the furnaces are installed without the provision of a pit and an air supply from outside the building. As usually installed, they have an open fretwork base and take air direct from the basement—air frequently contaminated by poisonous gases and the odor of decaying vegetables.

A point in furnace construction which may be readily followed up by both architect and builder is the method of taking the heated air from the furnace. The top casing of the furnace is what might be designated as the hot air reservoir, and from this the various hot air ducts are taken. In all furnaces there is a certain amount of flue surface leading to this top casing. It is a common practice among some contractors installing furnaces to take more air from