

**FURNACE HEATING: A
PRACTICAL AND
COMPREHENSIVE TREATISE ON
WARMING BUILDINGS WITH HOT
AIR**

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Furnace Heating: A Practical and Comprehensive Treatise on Warming Buildings with Hot Air
by William G. Snow

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WILLIAM G. SNOW

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WARMING
BUILDINGS WITH HOT AIR**

FURNACE HEATING

A Practical and Comprehensive Treatise on
Warming Buildings with Hot Air

With Appendices:

I.—Furnace Fittings

II.—Miscellaneous Notes on Furnace Heating

FOURTH EDITION, ENLARGED

By WILLIAM G. SNOW

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American Society of Heating and Ventilating Engineers

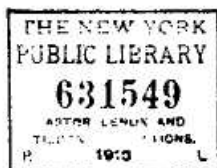
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PREFACE.

Since the first edition of this treatise was prepared, in 1900, a considerable advance has been made in the practice of furnace heating, and the theory in relation to it has received greater attention. Rules based on heat losses through walls and glass and the heat given off by furnaces have in a large measure superseded "rule of thumb" methods. Failures are doubtless fewer, due to a better understanding of the subject on the part of architects and heating contractors.

This treatise, to which much new matter has been added, covers the subject of furnace heating in a general way, but for detailed information as to the construction of furnaces the reader is referred to manufacturers' catalogues.

Attention is called to the note under the heading, Appendix I, page 120.

It has been the author's intention to give due credit to the sources of information set forth in these pages.

WILLIAM G. SNOW.

BOSTON, 1908.

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CHAPTER I.

FURNACES.

A furnace consists essentially of a stove within a casing. Air is admitted to the space between the two, where it becomes heated, rises, and flows through the pipes to the various rooms.

The earlier forms of furnaces were practically ordinary heating stoves incased in brick work. Such furnaces were very deficient in heating surface, and consequently were wasteful in the consumption of fuel. Various methods were adopted to increase their heating surface and efficiency. Radiators were added through which the gases would pass and lose a considerable portion of their heat before reaching the smoke pipe. Projections or extended surface in the form of pins or ribs were cast on the fire pot, or the pot, in some cases, was made corrugated. In other furnaces flues were added, through which the fresh air supply would pass, surrounded by hot gases.

Small air flues, pins and ribs retard the flow of air over the heating surface, hence are not so effective as, at first thought, they appear.

AREA OF AIR PASSAGES.

Furnaces with sufficient heating surface properly arranged and having the area of the air passages not greatly in excess of the combined area of the warm air pipes will deliver air at a nearly uniform temperature, even during strong winds.

When the passages are too large the wind will force an excessive amount of air through the furnace, much of which will fail to come in contact with the heating surface, with the result that the air issuing from the registers will vary greatly in velocity and temperature.

The examination of a number of well proportioned furnaces showed the average area for the passage of air to be about 180 square inches per square foot of grate surface, equal to about $1\frac{1}{4}$ square inches of free air-way to each square inch of grate surface.