

of the chimney. The chimney shall be high enough so that the wind from any direction shall not strike the top of the chimney from an angle above the horizontal. The chimney shall be properly capped with stone, terra cotta, concrete, cast-iron, or other approved material; but no such cap or coping shall decrease the flue area.

The size or area of flue lining or of brick flue depends on height of chimney and capacity of heating system. For chimneys not less than 35 ft. in height above grate line, the net internal dimensions of lining should be at least $7 \times 11\frac{1}{2}$ in. for a total leader pipe area up to 790 sq. in. Above 790 and up to 1000 sq. in. of leader pipe area the lining should be at least $11\frac{1}{4} \times 11\frac{1}{4}$ in. inside. In case of brick flues not less than 35 ft. in height with no linings, the internal dimensions should be



FIG. 8. ELEVATION OF THE WARM AIR RESEARCH RESIDENCE

at least 8×12 in. up to 790 sq. in. of leader area, and at least 12×12 in. for leader capacities up to 1000 sq. in. Chimneys under 35 ft. in height are often unsatisfactory in operation and hence should be avoided.

TYPICAL EXAMPLE

The application of the preceding data to an actual example may be of assistance to the designer. Figs. 8, 9, 10, 11 and 12,* represent the plans of the Warm Air Research Residence of the *National Warm Air Heating and Ventilating Association*, recently erected at the University of Illinois.

Assuming all air recirculated, the minimum furnace for the plant will be:

$$\text{Grate Area} = 0.0034 \times 132,370 = 450 \text{ sq. in.} = 24 \text{ in. diam. at } 175 \text{ deg. register temperature. (7)}$$

$$\text{Grate Area} = 0.0040 \times 132,370 = 530 \text{ sq. in.} = 26 \text{ in. diam. at } 160 \text{ deg. register temperature. (8)}$$

(10)

*Plans used with permission and bath room on third floor not heated at present.

CHAPTER XI—GRAVITY WARM-AIR FURNACE HEATING

If provision shall be made for certain outside air circulation, then increase the building heat loss by, say 25 per cent and obtain by equation (7) a 27-in. grate and by equations (8) and (10) a 29-in. grate.

SUMMARY OF DATA APPLIED TO WARM AIR RESEARCH RESIDENCE

Rooms	From Chapter I on Heat Losses from Buildings B.t.u. Heat Losses H	Leader Area Sq. In.	Stack Area Sq. In. $0.7 \times LA$	Leader Diameter Inches	Stack Size Net	Register Size Gross
First Floor		$= 0.009H$				
Living.....	17250	155	---	14	---	14×18
Dining.....	6810	61	---	9	---	8×12
Breakfast.....	2300	21	---	8	---	8×10
Kitchen.....	9210	83	---	11 or 12	---	12×14
Sun.....	25710	230	---	Two 12	---	Two 12×14
Hall and stair.....	12570	113	---	12	---	12×14
Second Floor		$= 0.006H$				
Owners.....	15030	90	63	11 or 12	5×12	12×14
S. W. Bed.....	9800	59	41	9	$3\frac{1}{2} \times 12$	8×12
Bath.....	2450	15	10	8	3×10	8×10
N. Bed.....	14800	89	62	11 or 12	5×12	12×14
Third Floor		$= 0.005H$				
E. Bed.....	8220	41	29	8	3×10	8×10
W. Bed.....	8220	41	29	8	3×10	8×10

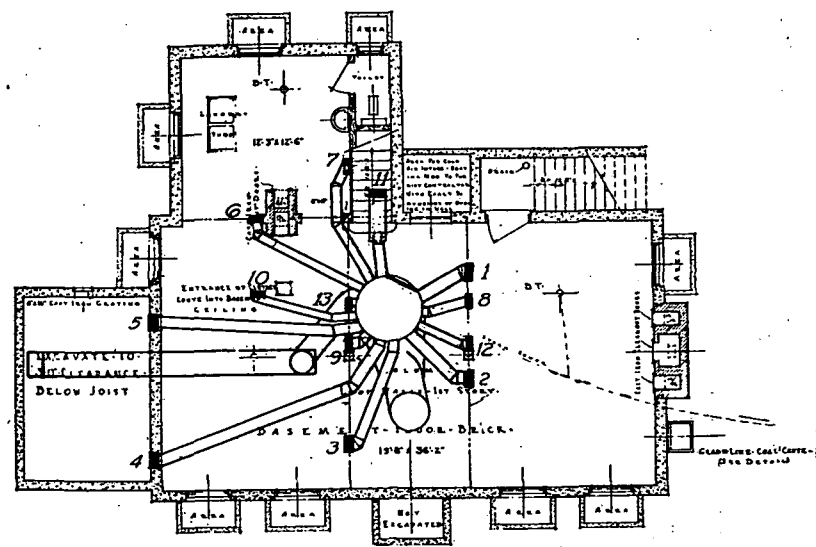


FIG. 9. BASEMENT PLAN