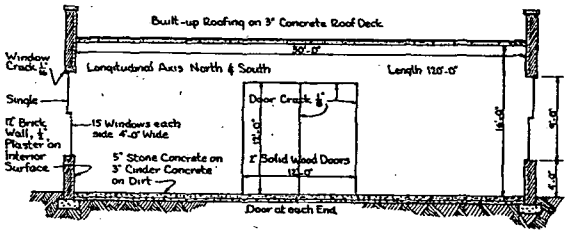

FIG. 9. ELEVATION OF FACTORY BUILDING

TABLE 45. CALCULATION SHEET SHOWING METHOD OF ESTIMATING HEAT LOSSES OF BUILDING SHOWN IN FIG. 9

PART OF BUILDING	EXPOSURE	WIDTH IN FEET	HEIGHT IN FEET	NET SURFACE AREA OR CRACK LENGTH	COEFFICIENT	TEMP. DIFF.	NET B.T.U.	EXPOSURE FACTOR	TOTAL B.T.U.
Brick, ½ in. plaster	N	50	16	656	0.277	59.6	10,820	1.15	12,460
Doors (2 in. Wood)	N	12	12	144	0.382	57.2	3,150	1.15	3,620
⅛ in. Crack	N	1 pair doors		60	3.34	57.2	11,440	½[a] x 1.15	6,580
Brick, ½ in. plaster	W	120	16	1380	0.277	59.6	22,800	1.15	26,200
Glass, (Single)	W	15 x 4	9	540	1.13	60.2	36,800	1.15	42,400
⅛ in. Crack	W	Double Hung Windows (15)		450	1.67	60.2	45,200	½[a] x 1.15	26,000
South Wall	Same as N	See Above						½[a]	19,690
East Wall	Same as W	See Above						½[a]	82,200
Roof, 3 in. Concrete and Slag-surfaced built-up roofing.	No Ceiling	50	120	6000	0.610	69.3	254,000	None	254,000
Floor, 5 in. Stone Concrete on 3 in. Cinder Concrete.	On Dirt	50	120	6000	0.521	5	15,630	None	15,630
GRAND TOTAL of heat required for building in B.t.u. per hour at +4 deg. with 11-mile northwest wind									488,780

[a]*Notes.*—(1) This building has no partitions and whatever air enters through the cracks on the windward side must leave through the cracks on the leeward side. Therefore, only one-half of the total crack will be used in computing infiltration for each side and each end of building.

(2) An exposure allowance of 15 per cent is also to be added to the wall and glass transmission losses and to the infiltration losses on the two adjacent sides of the building most nearly facing the prevailing wind as stated in the first paragraph on page 73.

(3) It is also possible to compute the heat required to take care of infiltration on the basis of half of an air change per hour as given in Table 38 for a factory with minimum conditions. Volume = 50 × 120 ×16 = 96,000 cu. ft. and heat required per hour is

$$96{,}000 \times \tfrac{1}{2} \times 0.075 \times 0.24 \times 59.6 = 51{,}500 \text{ B.t.u.}$$

Based on infiltration through one-half the total crackage in all walls, the heat to be supplied per hour is from Table 45

$$6{,}580 + 26{,}000 + 5{,}720 + 22{,}600 = 60{,}900 \text{ B.t.u.}$$

The value based on crackage should be used, but if building is to be heated intermittently, not less than one air change per hour should be allowed.

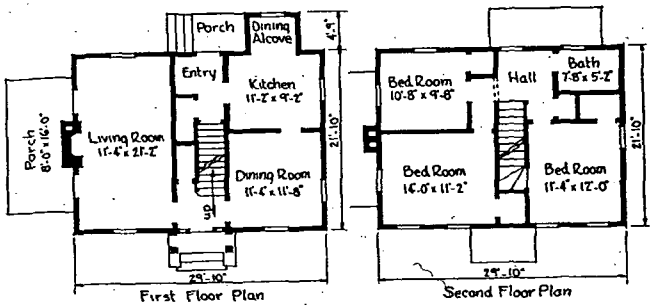

FIG. 10. FLOOR PLAN OF SIX-ROOM RESIDENCE[a]

[a]Plan 6-F-3, Architects Small House Service Bureau.

13. CALCULATIONS:

See calculation sheet, Table 45.

RESIDENCE (See Fig. 10)

1. LOCATION.....Chicago, Ill.
2. LOWEST OUTSIDE TEMPERATURE (Table 3).....— 23 deg. fahr.
3. BASE TEMPERATURE.....(— 23 + 15) = — 8 deg. fahr.
4. DIRECTION OF PREVAILING WIND (during Dec., Jan., Feb., Table 3).....Southwest
5. INSIDE TEMPERATURE .....70 deg. fahr.
6. TEMPERATURE DIFFERENCE (item 5 — item 3).....78 deg. fahr.
7. AVERAGE WIND VELOCITY (during Dec., Jan., Feb., Table 3).....17 miles per hour
8. CONSTRUCTION:

Walls—Wood siding, building paper, wood sheathing, studding, wood lath and plaster.

Roof—Wood shingles on 1 x 4 strips spaced 2 in.

Attic Ceiling—Wood lath and plaster on roof rafters

First Floor (over basement)—Maple flooring on rough flooring on floor joists

Doors (outside)—Three, 3 ft. x 7 ft. x 1¾ in.; one, 2 ft. 8 in. x 7 ft. x 1¾ in. No weatherstripping

Windows—Double-hung, single glass, weatherstripped.

9. TRANSMISSION COEFFICIENTS:

Walls—(Table 24)..... $U = 0.263$
Roof (including attic ceiling)—(Table 34)..... $U = 0.285$
Floor (over basement)—(Table 29)..... $U = 0.339$
Doors—(Table 36)..... $U = 0.421$
Windows—(Table 36)..... $U = 1.13$

10. INFILTRATION COEFFICIENTS:

Windows—The leakage per foot of crack for weatherstripped, double-hung, wood sash windows is 27.0 cu. ft. per hour for a 17-mile wind velocity. (By interpolation from Table 39, Part II.) The heat equivalent is

$$27.9 \times 0.075 \times 0.24 = 0.5 \text{ B.t.u. per hour per foot of crack.}$$

Doors—Assume $\frac{1}{16}$ in. crack. Leakage = 139 cu. ft. per hour. (Table 39, Part II). The heat equivalent is

$$139 \times 0.075 \times 0.24 = 2.50 \text{ B.t.u. per hour per foot of crack.}$$