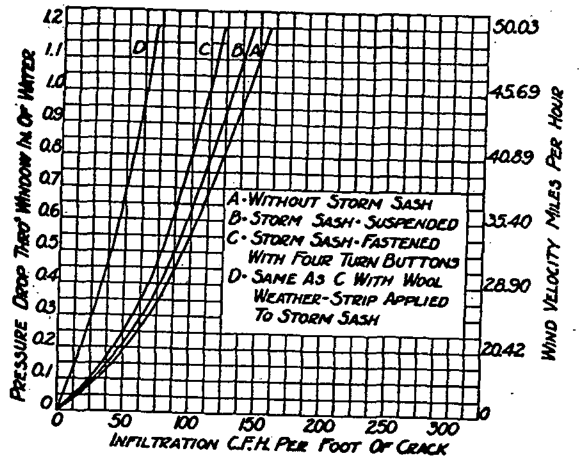

FIG. 7. INFILTRATION THROUGH SASH PERIMETER OF WINDOW WITH AND WITHOUT STORM SASH—5/64 IN. CRACK AND 1/32 IN. CLEARANCE

Figs. 7 and 8 show the results of tests that were made at the University of Wisconsin to establish the value of storm sash for reducing infiltration. While the tests were made on storm sash only, the results and conclusions would no doubt also apply to storm doors.

Fig. 7 shows the results of the application of storm sash to a tight window and Fig. 8 shows the application of storm sash to a loose window.

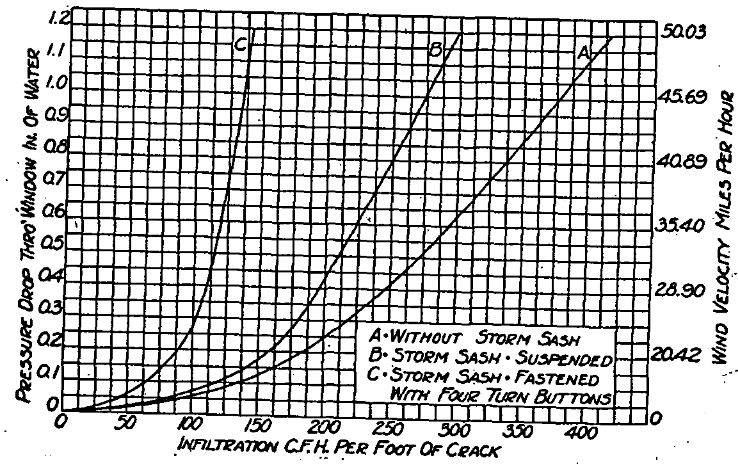

FIG. 8. INFILTRATION THROUGH SASH PERIMETER OF WINDOW WITH AND WITHOUT STORM SASH—1/8 IN. CRACK AND 1/8 IN. CLEARANCE

A study of these curves leads to the conclusion that a storm sash is of very little value in reducing infiltration when applied to a well fitted window, but that a reduction of about 50 per cent might be expected when storm sash is securely applied to a poorly fitted or loose window. Curves B and C, Fig. 8 show that much better results are obtained by means of turn buttons on the outside than by securing the storm sash with toggle links on the inside.

Calculations for Infiltration

In order to arrive at the heat required for warming up the air entering by infiltration, the following procedure is necessary:

First, determine the average wind movement in miles per hour for the locality in question (Table 3);

Second, determine the inleakage of outside air per lineal foot of the given window or door crack in cubic feet per minute at the given wind velocity, Table 15 or 16;

Third, express the heat equivalent in B.t.u. per hour per foot of crack to heat this air 1 deg. fahr.

Thus, for a plain wood window having 1/16 in. *crack* and 3/64 in. *clearance* (see Fig. 5), which means the air channel around the edge of the sash is approximately 1/16 in. wide, the heat equivalent of the air leaking in for a 0–70 deg. fahr. temperature difference is 157 B.t.u. per foot of crack per hour (Table 15, Part II). This value is found in the sixth column of the table. The computation for obtaining 157 is:

$$124 \times 0.075 \times 0.24 \times 70 = 157 \text{ B.t.u.},$$

where

124 = cubic feet of air per foot of crack per hour for a 15 mile wind for 3/64 in. clearance from the 5th column of Table 15.
0.075 = air density at 70 deg. fahr., pound per cubic foot.
0.24 = specific heat of air, and
70 = difference in temperature between inside and outside air.

The most convenient values for use in infiltration calculations are the coefficients of infiltration for the particular kind of crackage with a wind velocity of 15 miles per hour under average conditions, with 1/16 in. *crack* and 3/64 in. *clearance* reduced by 20 per cent (Table 15, Part II).

For a wind velocity other than 15 miles per hour, use the proper velocity for that locality in place of 15. For temperature gradients other than 70 deg. multiply the value given in the tables by the new temperature gradient and divide by 70. For special cases involving unplastered walls or storm sash use values obtained from Table 17 or Figs. 7 and 8.

Infiltration Due to Temperature Difference

Even without wind movement, a difference of temperature between inside and outside of a building will cause the pressure state inside to be less than that outside near the ground, and greater near the roof; infiltration will occur at windows in the lower part of the building, and exfiltration at windows in the upper part. Thus in the case of a building 200 ft. high; arranged in stories with more or less free communication