In the case of air space construction, two additional surface coefficients for each air space must be inserted in either equation (5) or (6). These surface coefficients may be taken the same as the K_1 (still air) values for the materials forming the sides of the air spaces; thus for a simple wall with one air space,

$$U = \frac{1}{\frac{1}{K_1} + \frac{1}{K_2} + \frac{1}{K_1} + \frac{1}{K_1} + \frac{x}{C}} \qquad (7)$$

or

$$= \frac{1}{\frac{3}{K_1} + \frac{1}{K_2} + \frac{x}{C}} \qquad (8)$$

With certain very special forms of construction which have irregular air spaces, it is necessary to use the conductivity for the unit construction as actually assembled in the wall. This condition exists when hollow tile is used as furring, in which case $\frac{x_1}{C_1}$ is replaced by $\frac{1}{C_u}$, where C_u is the unit conductivity. See third footnote of Table 4.

TABLE 5. FACTORS TO BE USED IN DETERMINING VALUES OF OUTSIDE SURFACE COEFFICIENTS (K_2) UNDER MOVING AIR CONDITIONS

Wind Velocity in Miles per Hour	Multipliers of K_1* Brickwork	Wood	Average
5	2.38	2.19	2.28
10	3.20	2.71	2.96
15	3.76	2.95	3.36**
20	4.22	3.02	3.62
Additional Values—Smooth Surface			
10	....	2.20	....
20	....	2.60	....
Above 20	....	3.00	....

*Taken from Engineering Experiment Station Bulletin No. 102, of the University of Illinois. Additional values from Engineering Experiment Station, Pennsylvania State College, reported by Professor Wood. Tests at Pennsylvania State College indicate character of surface, rough or smooth, more important than material of surface.
**This is usually taken as 3 even.

In each case factor is based on still air coefficient (K_1) for *same* material. For conditions where wind velocity is not known use the factor (3) or take K_2 as $3K_1$ for same material.

Examples of Computations for Walls

The following examples, Fig. 3, will serve to illustrate the method of computing heat transmission coefficients for building walls, including solid walls (simple and compound) and hollow walls. In these examples it has been assumed that a wind movement of about 15 miles per hour exists on the outside of the wall.

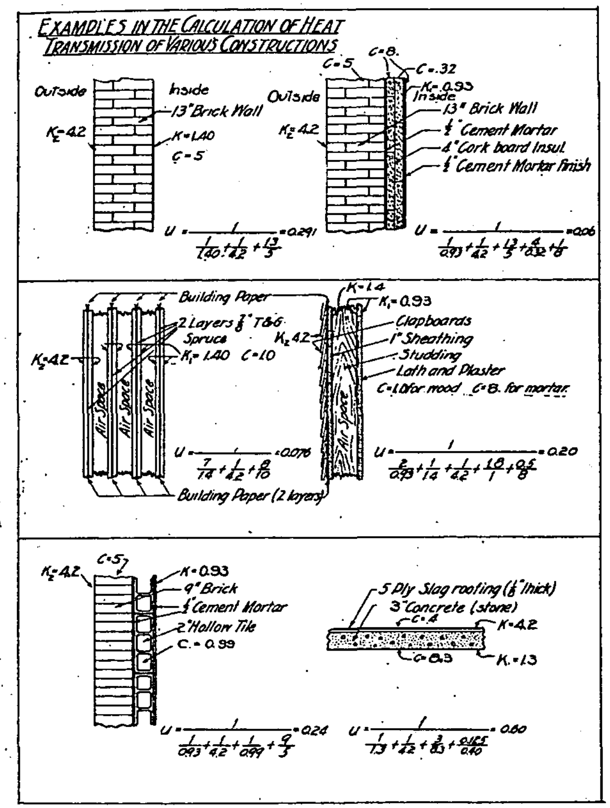

FIG. 3. COMPUTING HEAT TRANSMISSION COEFFICIENTS FOR BUILDING WALLS.

Tables 6 to 12 give transmission constants for a number of types of building construction. These values were determined by computation similar to that shown in Fig. 3, using the values for K and C indicated.

C = conductivity constant for the material. C_{pl}, C_s, C_b etc. conductivity for plaster, stucco, brick etc. C_t4 in. = conductivity constant for the actual (4 in.) thickness of tile. Considerable variation exists in heat transmission constants used by different authorities, which is due in part to the fact that further research work must be done along this line and also to the fact that the same kind of building material may differ widely depending upon the source and treatment of the raw material from which it is made.

Transmission constants are given for both still air and 15 mile wind. For practical purposes, the constants for any other wind velocity may be obtained with a fair degree of accuracy by interpolating between these values. In a table of this kind it is practically impossible to give values for all types of construction in use and the engineer will frequently be required to determine his own values, as in the examples Fig. 3.