Therefore, the thickness at which the sum of the costs is a minimum, is the most economical.

The method of using the chart Fig. 6 is as follows:

From the number of hours of operation per year at the bottom of the chart proceed upward to the line showing value of heat in dollars per million Btu using the appropriate scale A or B. Proceed right to temperature difference line using either scale A or B. Move upward to the line representing conductivity of the insulation being considered, then left to discount line, upward to the percent fixed charge line, right to the pipe size or flat surface line and read the economic thickness at top on the scale corresponding to the scales selected for value of heat and temperature difference. For example; with Scale B Heat Value and Scale A temperature difference or vice versa, use scale A-B economic thickness. If the intersection with the flat surface is on the *flat surface continued* curve, the economical thickness is read on the prime scales A′-A′, A′-B′ or B′-B′.

Cost of insulation refers to incremental cost in place; *i.e.*, average incremental cost per unit thickness after the first unit. The first inch of insulation will usually cost more than each additional inch. This is due to loss of finish, contractor's set-up and operating costs, which do not increase in proportion with thickness. The first inch of insulation, except in very unusual cases, provides enough saving in heat cost out of bare surface cost to more than cover these extra first costs. To obtain discount from insulation list price, first obtain applied prices for the desired type of insulation in one-inch, two-inch, etc., thickness. Then determine the average incremental cost per inch above one-inch thickness.

TABLE 7. THICKNESS OF PIPE INSULATION ORDINARILY USED INDOORS[a]

Steam Pressure Psig or Condition	Steam Temperature Fahrenheit Degrees	Thickness of Insulation		
		Pipes Larger Than 4 In.	Pipes 2 In. to 4 In.	Pipes ½ in. to 1½ in.
0 to 25	212 to 267	1 in.	1 in.	1 in.
25 to 100	267 to 338	1½ in.	1 in.	1 in.
100 to 200	338 to 388	2 in.	1½ in.	1 in.
Low Superheat	388 to 500	2½ in.	2 in.	1½ in.
Medium Superheat	500 to 600	3 in.	2½ in.	2 in.
High Superheat	600 to 700	3½ in.	3 in.	2 in.

[a] All piping located outdoors or exposed to weather is ordinarily insulated to a thickness ½ in. greater than shown in this table, and covered with a waterproof jacket.

Incremental cost in percent discount from list is

$$100\left(1 - \frac{X}{Y}\right)$$

where

X = average incremental cost in place per inch above one inch
Y = list price for one inch

Note that in figuring pipe insulation, use the list price for one-inch thickness for a pipe size consistent with the average incremental cost per inch. For example, if the average incremental cost per inch is based on applied prices for one, two, and three inches, the incremental cost of the second and

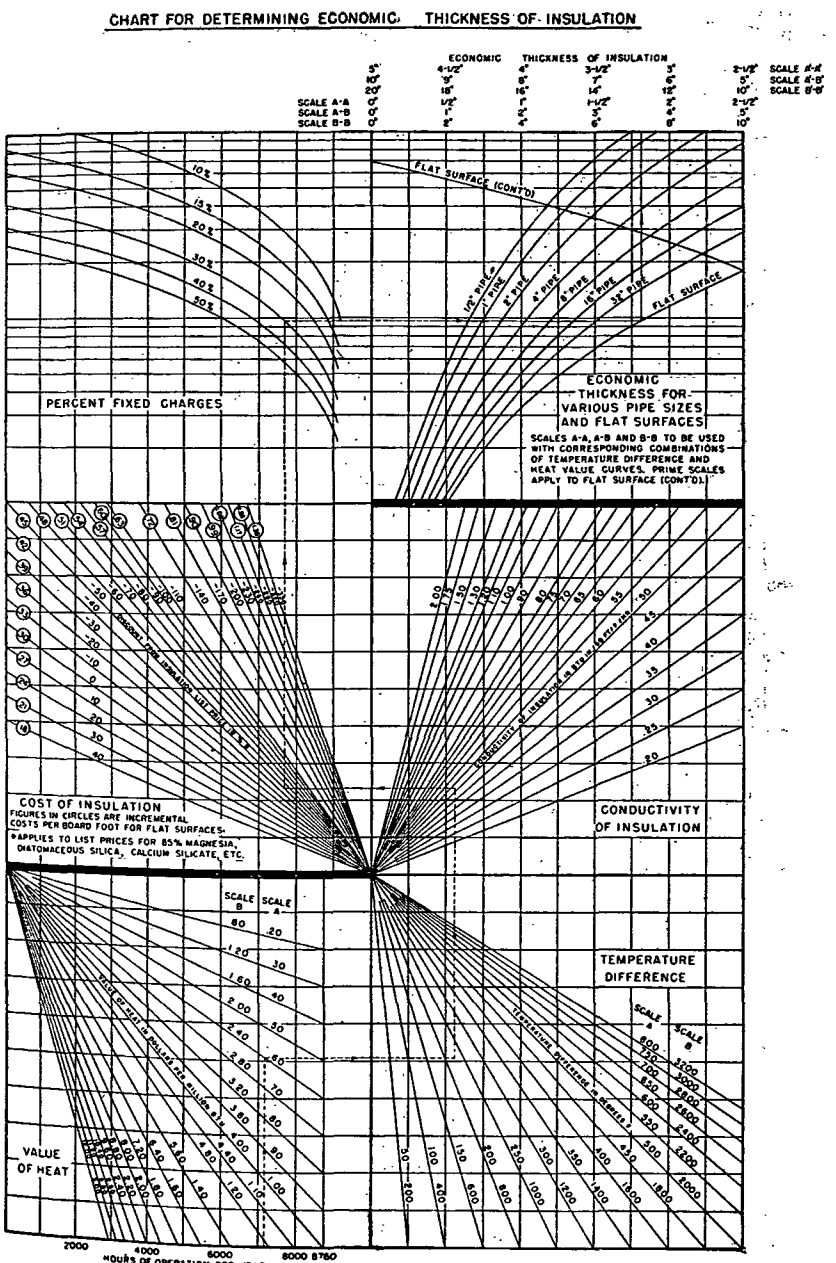

FIG. 6. CHART FOR DETERMINING ECONOMICAL THICKNESS OF PIPE INSULATION
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