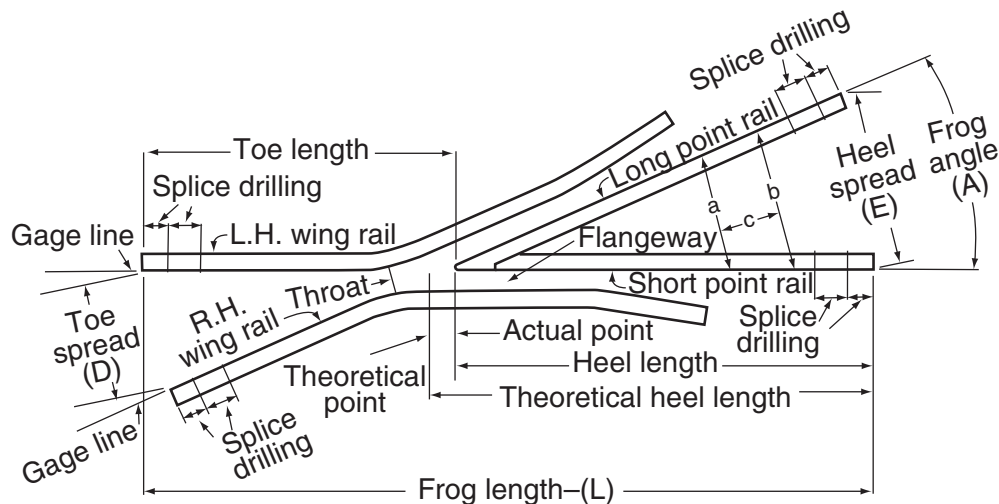


**Determining Frog Number.** Frogs are designated by numbers which correspond to certain angles called frog angles. The frog number is the ratio of its length to its width, or the number of inches in length necessary for it to spread one inch in width. For example, a No. 3 spreads 1 in 3, a No. 6 spreads 1 in 6, a No. 9 spreads 1 in 9, etc. By referring to trigonometric tables the frog angle (A) may be found if the frog number (N) is known. The formulas expressing the relationship between A and N are:  $N = 1/2 \cot 1/2 A$  and  $\cot 1/2 A = 2N$ .



In order to have good track, the angle of the frog must be suitable for the radius of the curve. Various rules and simple formulas which do not involve trigonometry may be used to eliminate guesswork in selecting proper frogs for various curves. The following formulas provide useful approximations, and the tables starting on page V - 21 give more exact information:

$$N = \sqrt{\frac{6R}{G}} \quad R = \frac{GN^2}{6}$$

Here N is the frog number, R is the radius of the curve in feet, and G the gage in inches. The first of these enables the frog number to be found when the radius and track gage are known; the second gives the radius of curve corresponding to a certain frog number and track gage.

For example: What number frog should be used for a curve of 36 feet radius and a track gage of 36 inches?

$$N = \sqrt{\frac{6 \times 36}{36}} = 2.5 \text{ (approx.)} \quad \text{Therefore, a No. 2-1/2 frog would be used.}$$

What radius curve is proper with a No. 3 frog if the track gage is 42 inches?

$$R = \frac{42 \times 3^2}{6} = 63 \text{ feet}$$

The approximate frog number of any straight frog may be found by measuring the total length of the frog and dividing it by the sum of the spreads between gage lines at each end of the frog. Expressed as a formula,

$$N = \frac{L}{D + E}$$

where L, D and E are the measurements shown in the drawing above. These measurements should be made in the same units - either all in inches, or all in feet.

**A Fast Method.** The following method is also used to find the number of any frog. Measure across the frog at a place (a) where the distance between the gage lines is an even number of inches; measure again where the distance (b) is an inch greater than at (a); the number of inches (c) between the two measured sections (a and b) is the number of the frog. See drawing above.