Gear teeth are formed in various ways, such as casting, cutting from solid casting, etc., and as it is only possible to make the teeth accurately by the latter method, we shall speak hereafter of *cut* teeth. In this case an accurately turned casting is taken of the same diameter as the outside of the teeth, and the metal forming the spaces between the teeth is carefully cut out, leaving accurate shapes if the work be properly done. The various terms applied to gear teeth will appear from Fig. 17. The *addendum* line is a circle whose diameter is that of the outside of the gear. The *root* or *dedendum line* is a circle whose diameter is that at the bottoms of the teeth. The difference between the radii of these two circles gives the *height* of the teeth. The dimension of the teeth parallel with the shaft is the *width of face* or often the *face* of the tooth, although the word *face* is also

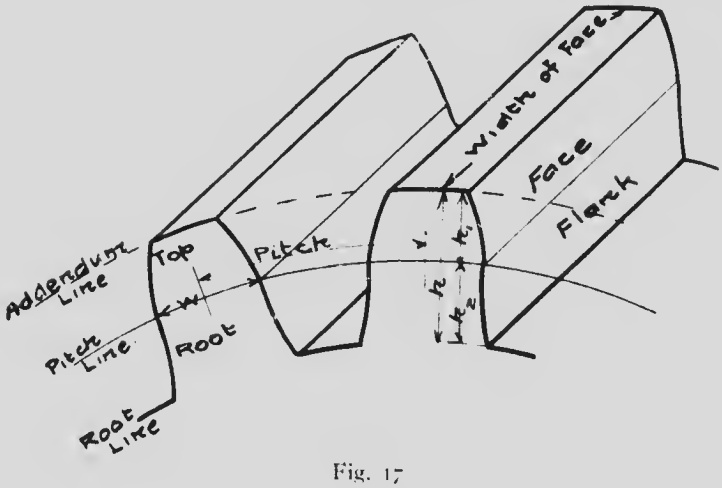

Fig. 17

used to denote the surface of the tooth outside the pitch line, the part of the surface of the tooth below the pitch line being the *flank*. The solid part of the tooth above the pitch line is the *point*, and the solid part below this line is the *root*.

Let d be the pitch diameter of a gear having t teeth, h_1 be the height of the tooth above the pitch line, and h_2 the depth below the pitch line, the total height $h = h_1 + h_2$; further, let w be the thickness of the tooth measured along the pitch line. The distance from centre to centre of teeth measured along the pitch line is the *circular pitch* or pitch p, and this definition at once gives $tp = \pi d$. As a matter of convenience Brown and Sharpe have introduced a second pitch, now also commonly adopted, called the *diametral* pitch and defined as $q = \frac{t}{d}$. It would naturally be expected that the diametral pitch would be the