by far the most common of these are the cycloidal and the involute teeth, so called because the curves forming them are cycloids and involutes respectively.

CYCLOIDAL TEETH

Select two circles PC and P^1C, Fig. 12, and suppose these to be mounted on fixed shafts, so that the centres A and B of the pitch circles, and the centres of the *describing circles* PC and P^1C, as well as the pitch point C, all lie in the same straight line, which means that the four circles are tangent at C. Now place a pencil at P on the circle PC and let all four circles run in contact without slipping, i.e., the circumferential velocity of

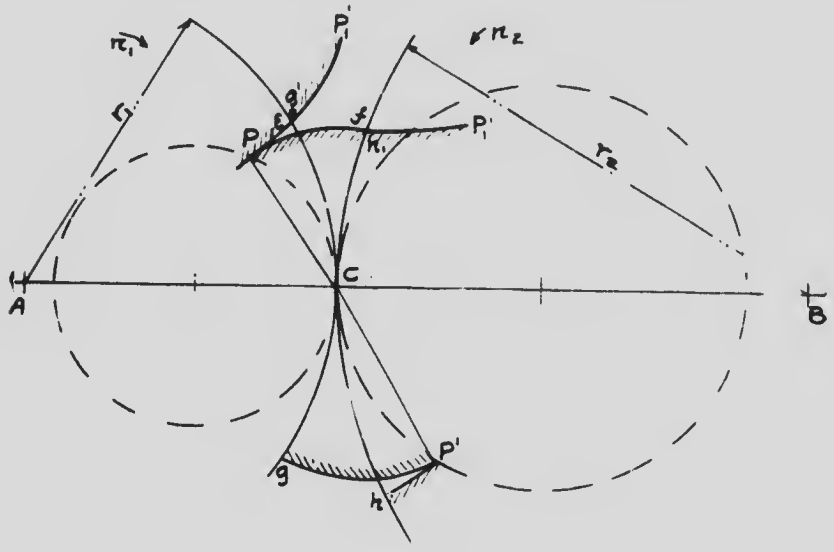

Fig. 12.

all circles at any instant is the same. As the motion continues P approaches the pitch circles ec and fc, and if the right hand body be extended beyond the circle fch, the pencil at P will describe two curves, a shorter one Pe on the body ecg and a longer one Pf on the body fch, the points e and f being reached when P reaches the point c, and from the conditions of motion are $PC =$ arc $ec =$ arc fc.

Now P is a common point on the curves Pe and Pf and also a point on the circle PC, which has the common point C with the remaining three circles. Hence the motion of P with regard to ecg is perpendicular to PC, and of P with regard to fch is perpendicular to PC; that is, the tangents to Pe and Pf at P are normal to PC, or the two curves have a common tangent