## MECHANICS OF MACHINERY.

tion of pressure between a given pair of tecth is always the line joining their point of contact to C, friction being neglected.

The are PC is called the arc of approach, being the location of the points of contact down to the pitch point C, and  $CP_1$  is called the are of recess, P being the last point of contact. The angles DAC and CAE are called respectively the angles of approach and receis. As will be explained later, the distance between the addendum and root circles and the pitch circle depends upon the number of teeth in the gear, so that with these circles fixed the length of the arc of contact PCP, will depend upon the diameters of the describing circles being longer as the describing circles become larger. If this are of contact is shorter than the distance between two teeth on the one gear, then only



Fig. 14.

one pair of teeth can be in contact at once, and the running is uneven, while, if this are is just equal to the distance between the centres of a given pair of teeth on one gear, or the pitch, as it called (See Fig. 17) one pair of teeth will just be going out of contact as the second pair is coming in, which will also cause jarring. It is usual to make PCP<sup>1</sup> at least 1.5 times the pitch of the teeth. This will, of course, increase the amount of slipping of the teeth.

With the usual proportions it is found that when the number of teeth in a wheel is less than 12 the teeth are not well shaped for strength or wear, and hence, although they will fulfil the kinematic conditions, they are not to be commended in practice.

20