

CHAPTER IV.

SLIDER-CRANK CHAINS.

34. Slider-crank Chain.—A very important chain is obtained from the quadric crank-chain by substituting a sliding pair for one of the turning pairs. It is obvious that the links will undergo the same relative change of position in Fig. 60 (*b*) as in Fig. 60 (*a*), although the lever *c* has been replaced by a block sliding in a circularly curved slot of the same radius as the original lever. The chain as thus transformed may be called a cylindric slider-crank chain, although this name is generally applied to the particular case in which O_{cd} is at an infinite distance and the block slides in a straight slot. It is plain that the mechanism of Fig. 60 (*c*) may be obtained from that of Fig. 60 (*b*) by continually increasing the radius of the pair *cd* until it becomes infinite. The pair *cd* may have prismatic surfaces of any form so long as the sliding motion is properly constrained; thus, for example, *c* may be a hollow block sliding on a prismatic rod *d*, Fig. 60 (*c*). The slider-crank chain in its cylindric form has of course plane motion, and is of special importance, since its different inversions form amongst others the mechanisms of various types of reciprocating steam-engines.

The six virtual centres of the slider-crank chain are easily found, exactly as in the case of the quadric crank-chain, but O_{cd} is always inaccessible. Fig. 61 shows the centrodes of the links *b* (representing the connecting-rod of a direct-acting engine) and *d* (representing the frame or bedplate). The centrode of *b* with respect to *d* (i.e., if *d*

