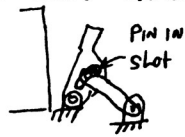


CHAPTER 1

- 1.2 a) This is a four-bar linkage
 b) motion generation. The "output" link is path like drum striker and angle of
 c)



- 1.3 a) Function generation. Input handle moves output shear slider



- b) c) four-bar slider

- 1.4 a) Watt II, the two ternary links are connected together and a ternary link is ground

- b) Function generation. The input and output links are pinned to ground.

- 1.5 a) Motion generation. The output link is not adjacent to ground. Also, the orientation of the window during its motion is of interest, it must move straight out away from the sill before it can rotate to its final position.

- b) There are 6 links and 7 f_1 pin joints.

$$F = 3(6-1) - 2(7) = 15 - 14 = +1$$

- c) Stephenson I, the two ternary links are not adjacent to each other. Also, the ground link is a binary connected to two ternary links.

- 1.6 An adjustable four bar linkage

Function generation. Although the input link is not adjacent to ground, the output link is. Also, the task is to move the output link to a closed position when the input link is moved.

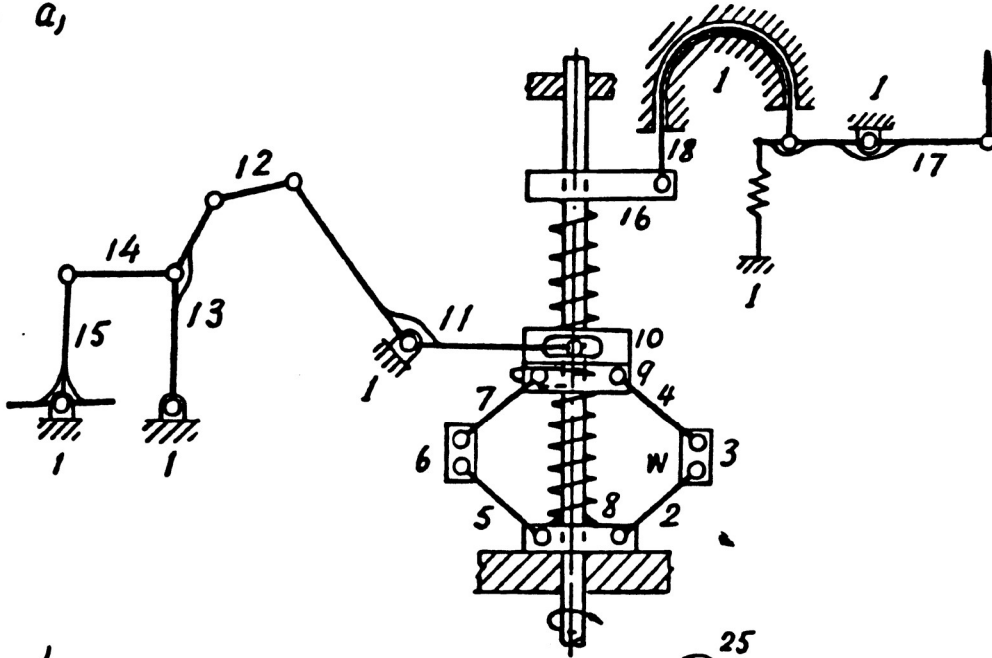
Because the output link must be moved first by larger than smaller angles per increment of input rotation of the handle in order to grip the workpiece quickly and to get a high force amplification between the vice jaws and the handle.

The function of the adjusting screw is to make the vice grips to be able to clamp the different size workpieces with approximately the same force amplification. It is located in the base link, because changing the length of the base link is the best way in which the force amplification can be kept approximately the same for different size workpieces.

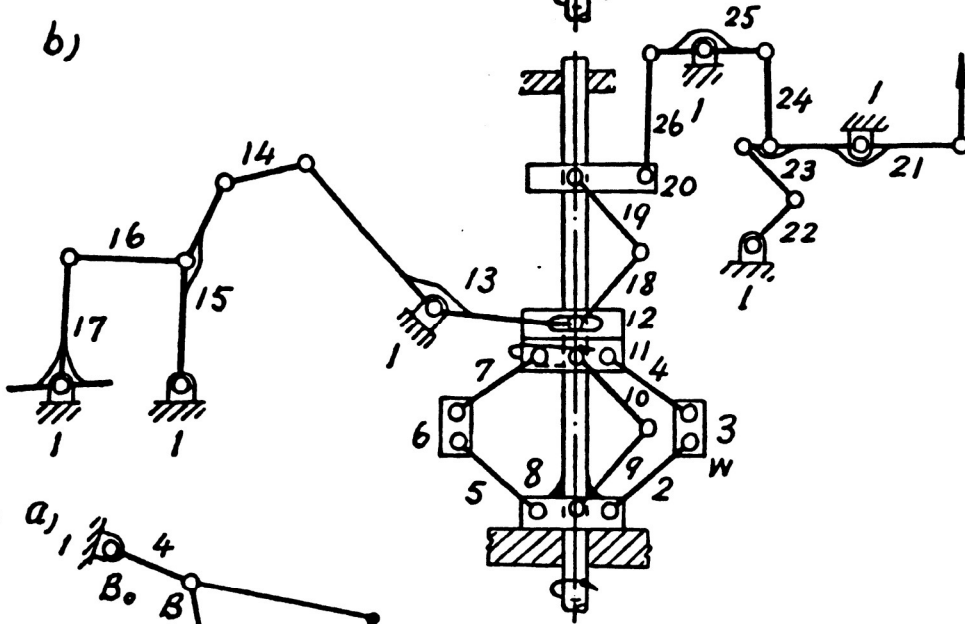
- 1.7 Function generation, both the input and output links are pinned to ground.

Because the output link must rotate in a prescribed relationship with the input link.

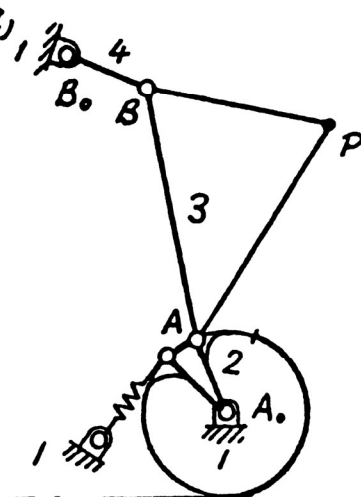
1.8 a)



b)

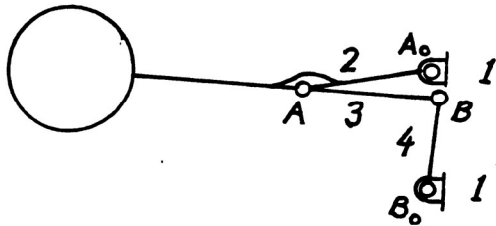


1.9 a)



b) A path generator linkage

1.10 a)



b) A function generator
input and output links are
pinned to ground.

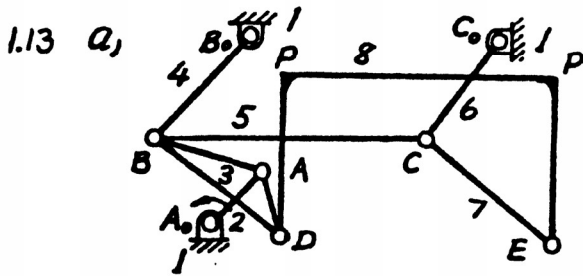
1.11 a) A motion generator

b) Because a linkage can work in the adverse circumstances

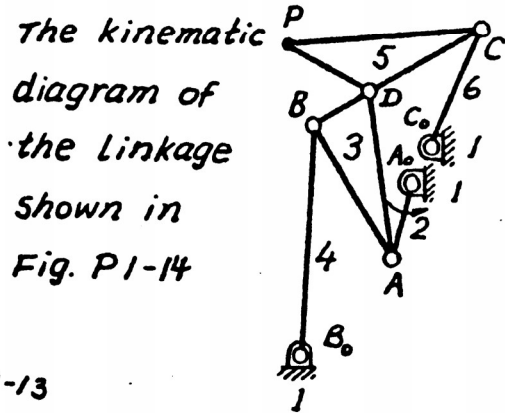
c) Stability in running of the car, since it guides the wheels straight up and down as the car runs over an uneven road.

1.12 a) A four bar linkage

b) Function generation



The kinematic diagram of the linkage shown in Fig. P1-13

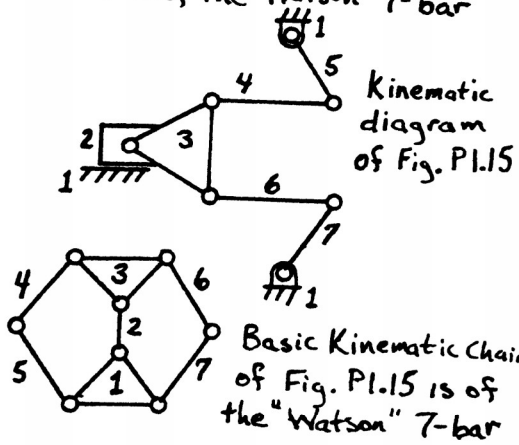


b) Stephenson III

1.14 a) For the linkage shown in Fig. P1.15
Function generation

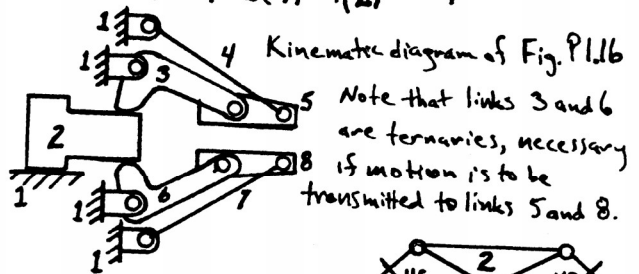
b) $F = 3(7-1) - 2(8) = +2$

c) None, the "Watson" 7-bar

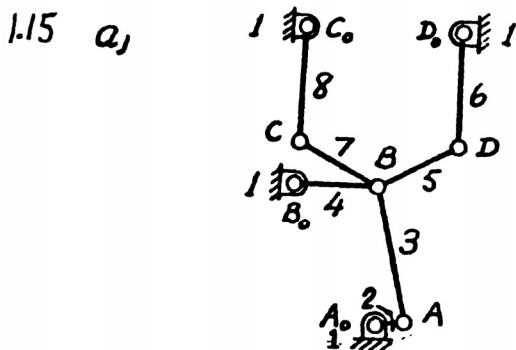


For the linkage shown in Fig. P1.16
Motion generation, jaws move parallel

$F = 3(8-1) - 2(9) - 1(2) = +1$



Basic Kinematic Chain of Fig. P1.16. "HS" is fictitious link which replaces higher pair slider gear joint. This topology consists of 3 concatenated Watt II six-bar linkages.



b) By Gruebler's equation:

$n = 8$

$p = 10$

$F = 3(8-1) - 2 \times 10$

$= 1$