6 LEGGED WALKER DRIVEN BY AN ELECTRIC SCREWDRIVER

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ABSTRACT

A new class of six-bar mechanisms with symmetrical coupler-point curves is presented. This class of mechanisms is made up of a four-bar linkage with an additional dyad to form an embedded regular or skew pantograph. Because the coupler curve generated at an output point is amplified from that a four-bar, a compact mechanisms with a relatively large coupler curve can be obtained. In addition, due to their structure arrangement, the analysis and synthesis of such mechanisms can be easily achieved. It is shown that the admissible range of transmission angle for such mechanisms is smaller than that of a four-bar mechanism. It is also shown that mechanisms with an embedded skew pantograph exhibit better design flexibility than those with an embedded regular pantograph. Finally, an example mechanism from this class is illustrated and compared with four-bar linkage with the same coupler curve. A six-bar linkage is a one degree-of-freedom mechanism that is constructed from six links and seven joints. An example is the Klann linkage used to drive the legs of a walking machine.

In general, each joint of a linkage connects two links, and a binary link supports two joints. If we consider a hexagon to be constructed from six binary links with six of the seven joints forming its vertices, the, the seventh joint can be added to connect two sides of the hexagon to forming a six-bar linkage with two ternary joints. This type of six-bar linkage is said to have the Watt topology.

A six-bar linkage can also be constructed by first assembling five binary links into a pentagon, which uses five of the seven joints, and then completing the linkage by adding a binary link that connects two sides of the pentagon. This again creates two ternary links that are now separated by one or more binary links. This type of six-bar linkage is said to have the Stephenson topology.