Application

Rhombuses

Many objects that need to change in size or shape are built in the shape of a rhombus. What makes this shape so useful is that if you keep the lengths of the sides the same, opposite sides remain parallel as you change the measures of the angles. A rhombus also has the property that as you change the measures of the angles, the vertices slide along the lines that contain the diagonals and the diagonals remain perpendicular. Two applications of this property are illustrated in the photographs below.

A rhombic shape can be used to support weight when the height of the object changes but the load must remain balanced. To use the jack shown above, you turn a crank. This brings the two hinges on the horizontal diagonal closer together and forces the hinges on the vertical diagonal farther apart, which lifts the car. Could a jack be in the shape of a parallelogram that is not a rhombus? Would a jack in the shape of a kite work?

The folding elevator gate shown at the right changes in width, but the vertical bars remain vertical. Some types of fireplace tongs can extend and retract in a similar way. Electric trains sometimes use rhombic arrangements to maintain contact with overhead wires even when the distance between the top of the coach and the wire changes. Can you think of other objects that use this property?