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The Dandelin Spheres

www.magicmathworks.org/geomlab9

We defend our claim that the illuminated points in 7.2 are foci.

Put a pen in the string loop. With the cord in tension run the pen round the pins to draw an ellipse. The construction depends on the property that, if a point maintains the same combined distance from two fixed points, it traces an ellipse.

But the converse is also true. If every point on an ellipse is the same combined distance from two fixed points, those points are foci.

In the picture the apparatus is sandwiched between two spheres in a cone. This is Pierre Dandelin's construction.

$a = a'$, $b = b'$ (tangents from a point).
 $a' + b'$ is constant, therefore $a + b$ is constant. So P, Q are foci.



