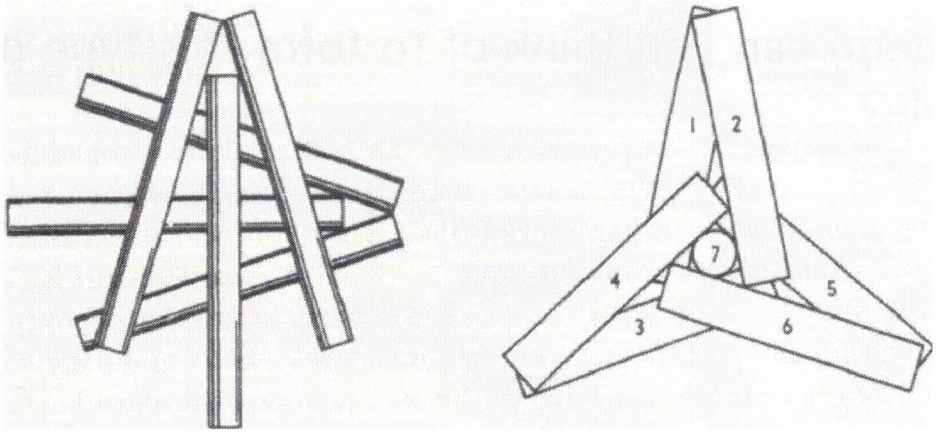
Solution

There are several different ways of placing the six pencils. The figure on the left shows the traditional solution as it is given in several old puzzle books.



Gardner remarked that, to his vast surprise, about fifteen of his readers discovered that *seven* cigarettes could also be placed so that each touched all the others! This of course makes the older puzzle obsolete. The figure on the right, sent to him by George Rybicki and John Reynolds, graduate students in physics at Harvard, shows how it is done. "The diagram has been drawn," they wrote, "for the critical case where the ratio of the length to diameter of the pencils is $\frac{7}{2}\sqrt{3}$. Here the points of contact occur right at the ends of the pencils. The solution obviously will work for any length-to-diameter ratio greater than $\frac{7}{2}\sqrt{3}$." For typical new pencils, this minimum-ratio condition is satisfied. Note that if the center pencil, pointing directly toward you in the diagram, is withdrawn, the remaining six provide a neat symmetrical solution of the original problem.

Aftermath

1. Show that the ratio of the length to diameter of the pencils must be greater than or equal to $\frac{7}{2}\sqrt{3}$ to achieve the seven-pencil solution.
2. What other interesting same-sized objects (and how many of them) can you think of to form this type of "touching" puzzle?
3.