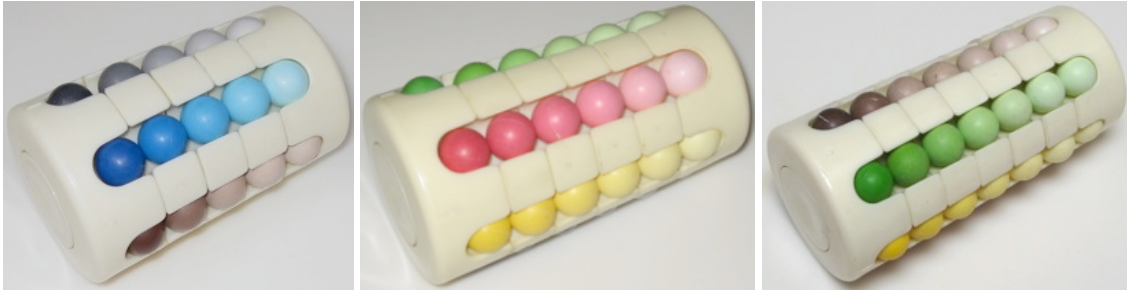# Babylon Towers

a.k.a. *Ivory Tower*
Patented in 1982 "Arxon Speil + Freizeit GMBH", made by Ideal Toy Co.;
Jaap's Page credits design to Endre Pap, who designed the Hungarian Rings.
(left: 5 sections, 6 cols., 1.9" base, 1.6" top, 3" long, 7/16" dia. balls;
middle: 6 sections, 6 cols., 1.9", 1.6", 3.5" long, 7/16" dia. balls;
middle: 7 sections, 6 cols., 1.9" base, 1.6" top, 3.9" long, 7/16" dia. balls)

Go from darkest to lightest color type in each column (*red*, *blue*, *green*, *yellow*, *brown*, *gray*). Different from *Whip-It Towers* and *Verikon Towers*, instead of a gap, there is a spring between two of the bottom balls that allows one to be pushed in so that the ball above it can drop down. This solution is based on one in *Jaap's Page*:

1. *Make each column have the same color type:* Push one ball in to create a gap and then proceed as for Whip-It Towers and Verikon Towers (i.e., when all shades of a given color are equivalent, you can essentially use the gap to move any piece where you want to).

2. *Place all but the top two balls of each column:* If XYZ are three consecutive balls in a given column, by making a gap in a column next to it, you can do XYZ -> YZX -> ZXY, and thus X can be moved down 2 sections, or Y can be moved down one section.

3. *Fix parity if necessary:* If an odd number of columns have the top two balls out of order, then rotate the top layer one position and repeat Step 1 on the top two layers only (so that the top two layers have the same color type as the already solved lower layers).

3. *Work two columns at a time to fix the top two layers:* Pairs of columns that have the top two balls out of order can be fixed with the following nine step transformation that manipulates 6 balls; the top two balls and the gap are denoted A, B, #, and the balls initially below these three positions are denoted X, Y, Z. In this figure, columns are shown next to each other, but they can be anywhere, and the top two layers are always shown rotated so that the 6 balls being manipulated are together:

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9
AB#	ABX	A#X	AYX	AY#	AYB	#YB	XYB	XY#
XYZ	#YZ	BYZ	B#Z	BXZ	#XZ	AXZ	A#Z	ABZ

Further reading:
Babylon Towers directions.
Jaap's Page, from: http://www.geocities.com/jaapsch/puzzles/tower.htm
Babylon Tower DE Patent, from: www.epo.org - patent no. DE3104021