Gear Cube

Invented by Oskar van Deventer, purchased from Mefferts, 2010.
(plastic, 2.3 inches)

Looks like a complicated version of Rubik's Cube, but is actually much easier to solve (see the Gear Cube Extreme for a harder to solve version). Here is the puzzle solved, the right face rotated 90 degrees, and the right face rotated 180 degrees:

Call the operation of rotating a face 180 degrees a flip; it is the only thing you can do:
- A 90 degree rotation of a face locks up the puzzle.
- Middle layers can only be manipulated by flip operations.
- A flip cycles the adjacent middle layer by 90 degrees and rotates its 4 gear edges by 60 degrees each; 3 flips returns the adjacent middle layer to flat, and 12 flips returns you to exactly where you started. A flip also has the effect of reordering two of the gear edges in each of the other two middle layers.
- Centers can move around, but the 4 gear edges of a middle layer never leave that layer.

Jaap's Page presents a solution. Here is an approach that requires essentially no memorization:
1. Restore puzzle to be flat (easy - do flips as needed).
2. Solve the corners (easy - faces cannot rotate 90 degrees).
3. Use step A to solve as much as possible, use Step B, and repeat until solved (repositioning the cube as appropriate):
   A. Flip the right face clockwise 6 times.
      (Exchanges front/rear and top/bottom of the vertical center layer).
   B. Flip the bottom face clockwise, flip the right face twice clockwise, flip the bottom face counter clockwise, flip the right face twice counter clockwise.
      (Exchanges front/rear of vertical center layer and left/right centers.)

Further Reading
Jaap's Page, from: http://www.jaapsch.net/puzzles/gearcube.htm

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