Spirallohedron - a space-filling body

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Russell Towle (1949-2008) – a Canadian computer specialist – describes an interesting surface called by him spirallohedron.
The surface given by Towle can be generated in the following way:
• Assume that the initial and the end point of a spiral on a cylinder are on the z-axis of the rectangular coordinate system and this spiral should be rotated around the z-axis through angle (i =1, 2, ... , n-1).
• The intersections of these spirals and the planes perpendicular to the z-axis are the vertices of a regular n-gon.
• If a point runs on the given spiral then the edges of the regular n-gons obtained form a surface which is called a spirallohedron by R. Towle.

Towle has proved of the n-armed spirallohedra obtained this way those with n=3 and n=4 can fill the space without gaps and overlaps.
We show how to approximate these surfaces by polyhedral with arbitrary accuracy. This also provides tool for finding the geometric transformations which play role in the space filling. In case n=3 applying the elements of the translation group of the tiling composed of cubes yields the corresponding spirallohedral tiling of space. The same is true in case n=4 for the translation group of the tiling composed of rhombic dodecahedra.

References

TOWLE, RUSSEL: Rhombic Spirallohedra , Symmetry: Culture and Science Volume 11, Numbers 1-4, 2000, (pp.: 293-306.)