What is claimed is:

1. An improved rotary engine of the type having an N-lobed rotor, an intake port, an exhaust port, and a housing with respect to which the rotor is mounted for rotational motion relative to the housing, the housing having N+1 lobe-receiving regions configured to successively receive the lobes as the rotor rotates relative to the housing, the housing having (i) a pair of sides axially disposed on first and second sides of the rotor, and (ii) a peak disposed between each pair of adjacent lobe-receiving regions, and , wherein the housing is further configured in relation to the rotor so as to establish a chamber associated with each one the lobe-receiving regions, wherein at least one of the chambers is configured to handle, in succession, intake, compression, combustion, expansion, and exhaust phases, wherein the improvement comprises:

configuration of the housing in relation to the rotor so as to establish at least one chamber dedicated solely to a function selected from the group consisting of cooling, compressing, pumping and any combination of any of the foregoing.

2. An engine according to claim 1, further comprising a removably attachable cartridge, containing a mixture of fuel and oil, in communication with the single fuel source.

3. An engine according to claim 1, wherein the function is cooling and the dedicated chamber is a cooling chamber.

4. An engine according to claim 3, wherein the cooling chamber is configured to receive flow of a cooling medium therethrough that also comes into contact with the rotor so as to cool the rotor.

5. An engine according to claim 4, wherein the cooling chamber is configured to receive axial flow of the cooling medium therethrough.

6. An engine according to claim 4, wherein the rotor includes at least one channel therethrough to receive flow of the cooling medium.

7. An engine according to claim 6, wherein the cooling chamber is configured to receive axial flow of the cooling medium therethrough and the at least one channel of the rotor is disposed axially.

8. An engine according to claim 7, wherein the rotor has a plurality of axial channels separated from one another by ribs.

9. An engine according to claim 8, wherein the ribs are angled so as to serve as fan blades to pump the cooling medium through the cooling chamber.

10. An engine according to claim 8, wherein the cooling medium is air and an aggregate volume of all of the chambers configured to handle, in succession, intake, compression, combustion, expansion, and exhaust phases is less than 500cc.

11. An engine according to claim 1, wherein the chambers are configured so that chamber volume at the end of the expansion phase is larger than the chamber volume at the start of the compression phase.

12. An engine according to claim 1, wherein the chambers are configured so that the chamber pressure at the end of the expansion phase is approximately 1 atmosphere.

13. An engine according to claim 1 and further comprising counterweights disposed within the rotor but coupled to a drive shaft so as to turn with the drive shaft and to counterbalance the rotor.