In models of formation oceanic of lithosphere it is standard practice to assume that the integration limit in the solution of the heat diffusion equation for the bottom boundary can be taken to infinity. This assumption implies that the growth in thickness of the lithosphere with time elapsed is unlimited. However, in the presence of changes in mechanisms that control thermal interaction processes at the lithosphere – asthenosphere boundary, the assumption of unlimited growth leads to unreasonable physical conditions. We point out that such difficulties can be overcome if we introduce the assumption that the formation of lithosphere is limited to the magma rich layer (MRM) in top part of the asthenosphere. Under this condition the geometry for development of the lithosphere is better described as finite half-space, and not semi-infinite half-space as stipulated in earlier works. The new model (designated FHS) is compatible with the current knowledge of the spatial domains of the lithosphere and the MRM layers. Results of numerical simulations reveal that theoretical values derived from FHS model provide vastly improved fits to observational data for heat flow and bathymetry for the entire age range of the oceanic lithosphere. More importantly, the improvements in model fits have been achieved without the need to invoke the ad-hoc hypothesis of hydrothermal circulation in the stable ocean basins. Implications of the new model results for understanding regional scale variations in global heat flow are discussed and the need to downsize the current estimates of global heat loss emphasized.