We present a new approach for diagnosing and physically interpreting the momentum balance of the Meridional Overturning Circulation (MOC). When a force is applied to the ocean, fluid parcels are accelerated locally, by the applied force, and remotely by the pressure gradients established to maintain continuity and satisfy the boundary conditions - the combined effect of these local and remote accelerations can be represented through a “rotational force”. Moreover, under the hydrostatic approximation, both the rotational forces and the velocity field can be further decomposed into (mostly wind-driven) barotropic and (mostly buoyancy-driven) overturning components, each of which can be represented through scalar potentials (analogous to the streamfunction for the MOC), even in the presence of arbitrary bottom topography. In this paper, we apply this decomposition to the modelled MOC in an idealized hemispheric basin and an ocean general circulation model. Over most of the ocean, the rotational Coriolis and buoyancy forces balance, consistent with thermal wind balance. However, along the basin boundaries, the rotational Coriolis forces vanish, allowing the rotational buoyancy forces to drive an MOC. In the models there is a close correspondence between the streamfunction for the MOC and the “forcefunction” for the buoyancy forces driving the MOC adjacent to the boundaries. This leads to the intriguing possibility that the buoyancy forces driving the MOC might be inferred from hydrographic observations at the margins of the ocean basins.