CLAIMS

1. A propulsion unit comprising:

a casing (20) comprising an upper portion (21) and a lower portion (22), the casing (20) being rotatably supported from the upper portion (21) at a hull (10) of a vessel,

a shaft (31) being rotatably supported with radial and axial oil lubricated roller bearings (32, 33) within the lower portion (22) of the casing (20), said shaft (31) having an axial centre line (X) and an outer end (31A) protruding from a first end (22A) of the lower portion (22) of the casing (20), the outer end (31A) of the shaft (31) being sealed with a sealing (34) to the first end (22A) of the lower portion (22) of the casing (20) in order to prevent water from penetrating into the casing (20),

a propeller (37) being attached to the outer end (31A) of the shaft (31) outside the first end (22A) of the lower portion (22) of the casing (20), said propeller (37) rotating with the shaft (31),

an annular housing (40) being fixedly supported at the casing (20), said axial centre line (X) of the shaft (31) also forming an axial centre line of the annular housing (40), said annular housing (40) surrounding an outer perimeter of the propeller (37) and forming a duct (45) for water flowing through the interior of the annular housing (40),

a rim drive electric motor (50) comprising a rotor rim (51) and a stator (52), said rotor rim (51) being provided on the outer perimeter of the propeller (37) and rotating with the propeller (37), said stator (52) being provided within the annular housing (40) and surrounding the rotor rim (51).

2. A propulsion unit according to claim 1, characterized in that a first radial plane (Y1) passing through an axial (X) middle point of the rotor rim (51) is situated outside the first end (22A) of the lower portion (22) of the casing (20).

3. A propulsion unit according to claim 2, characterized in that the first radial plane (Y1) passing through the axial (X) middle point of the rotor (51) and

a second radial plane (Y2) passing through an axial middle point between the bearings (32, 33) are at an axial (X) distance (A1) from each other.

4. A propulsion unit according to any one of claims 1 to 3, characterized in that an inner surface of the annular housing (40) comprises an annular groove (46), said rotor rim (51) rotating within said annular groove (46).

5. A propulsion unit according to claim 4, characterized in that there is a passage (P1) between the rotor rim (51) and the housing (40) in the groove (46), whereas water can pass through said passage (P1) in order to cool the rotor (51) and the stator (52).

6. A propulsion unit according to any one of claims 1 to 5, characterized in that the duct (45) passing through the interior of the annular housing (40) is cylindrical.

7. A propulsion unit according to any one of claims 1 to 6, characterized in that at least the first end (22A) of the lower portion (22) of the casing (20) is situated within the annular housing (40).

8. A propulsion unit according to any one of claims 1 to 7, characterized in that the rotor (51) is a permanent magnet rotor.

9. A propulsion unit according to any one of claims 1 to 8, characterized in that the cooling of the stator (52) is arranged as a passive cooling directly through the shell of the housing (40) to the sea water surrounding the shell of the housing (40).