Claims

1. A drive unit for a skid steered vehicle, the drive unit comprising:

a controlled differential positioned between and connecting two shafts and being in driveable communication with each shaft, wherein the end of each shaft remote from the controlled differential forms an output of the drive unit, and wherein outputs from the controlled differential connect directly via the shafts to the drive unit outputs such that outputs of the controlled differential attach solidly to and turn at the same speed as the drive unit outputs;

at least one steer motor in driveable communication with the controlled differential;

at least one electric propulsion motor in driveable communication with the drive unit outputs; and

a gear reduction unit and/or gear change unit positioned between the controlled differential and the at least one electric propulsion motor and in driveable communication with the drive unit outputs, such that a routine maintenance is facilitated by this arrangement wherein the at least one electric propulsion motor, the gear reduction unit and the optional gear change unit are connected in a parallel connection with an output of the controlled differential to the drive unit outputs.

2. A drive unit as claimed in claim 1 , wherein the controlled differential, the at least one steering motor, the at least one electric motor, the gear reduction unit and optional gear change unit are located within a housing.

3. A drive unit as claimed in claim 1 or claim 2, wherein the controlled differential comprises two epicyclic gear sets, wherein a rotational component of a first one of the epicyclic gear sets is constrained to move together with a rotational component of the second one of the epicyclic gear sets.

4. A drive unit as claimed in claim 3, wherein a ring gear of the first one of the epicyclic gear sets is constrained to move together with a ring gear of the second one of the epicyclic gear sets.

5. A drive unit as claimed in claim 4, wherein the two epicyclic gear sets share a common ring gear.

6. A drive unit as claimed in any one of claims 3 to 5, wherein a carrier of the first one of the epicyclic gear sets and a carrier of the second one of the epicyclic gear sets comprise the outputs of the controlled differential.

7. A drive unit as claimed in claim 3 wherein a ring gear of the first one of the epicyclic gear sets and a ring gear of the second one of the epicyclic gear sets comprise the outputs of the controlled differential.

8. A drive unit as claimed in any one of claim 3 to claim 7, wherein the at least one steering motor is in driveable communication with a rotational component of a first one of the epicyclic gear sets.

9. A drive unit as claimed in claim 8, wherein a rotational component of the second one of the epicyclic gear sets is constrained against rotation.

10. A drive unit according to any preceding claim, comprising a brake assembly located substantially within a rotor of the at least one propulsion motor.

11. A drive unit according to any preceding claim, comprising two electric propulsion motors, wherein the controlled differential is located between the electric propulsion motors.

12. A drive unit according to claim 11 , comprising two gear reduction units and/or two gear change units, wherein each gear reduction unit and optional gear change unit is located between the controlled differential and one of the electric propulsion motors.

13. A drive unit according to any preceding claim, wherein the major axis of the at least one electric propulsion motor is co-axial with the shafts.

14. A gear change unit comprising:

a gear reduction unit, wherein the gear reduction unit comprises an epicyclic gear set having an input component and an output component, wherein the output component is configured to provide a final drive input from the gear change unit to a drive shaft; a gear change set, wherein the gear change set comprises a master gear configured to receive a drive output from an electric propulsion motor and one or more slave gears, wherein the one or more slave gears are configured to be driven by the master gear via one or more gear chains; and

a slideable dog clutch operably connectable to a gear change selector, wherein the slideable dog clutch is in slideable engagement with the input component of the gear reduction unit and constrained for rotation therewith, wherein the slideable dog clutch is configured to be engageable with the master gear and/or the one or more slave gears of the gear change

set so that, in use, the relative position of the slideable dog clutch with respect to the input component of the gear reduction unit determines which gear of the gear change set is engaged with the input component of the gear reduction unit.

15. A gear change unit as claimed in claim 14, wherein the gear change set comprises an epicyclic gear set, wherein the master gear comprises an input to the epicyclic gear set.

16. A gear change unit as claimed in claim 14 or claim 15, wherein the gear change set comprises two or more epicyclic gear sets arranged in series, wherein the master gear comprises an input to a first epicyclic gear set in the series, and wherein the one or more slave gears comprise a carrier or a sun gear of another epicyclic gear set in the series.

17. A gear change unit as claimed in any one of claims 14 to 16, wherein the input component of the gear reduction unit comprises an elongate boss, wherein the slideable dog clutch is slideably connected to the elongate boss, and constrained for rotation therewith by interengaging splines located on the elongate boss and the slideable dog clutch respectively.

18. A gear change unit as claimed in any one of claims 14 to 17, wherein the input component comprises a sun gear of the gear reduction unit and the output component comprises a carrier of the gear reduction unit.

19. A gear change unit as claimed in claim 18, wherein the sun gear of the gear reduction unit comprises a central opening through which the drive shaft passes.

20. A gear change unit as claimed in claim 19, wherein the sun gear of the gear reduction unit is arranged to float on the drive shaft such that, in use, the sun gear is centred for rotation about the drive shaft by a plurality of planet gears of the gear reduction unit.

21. A gear change unit as claimed in claim 20, wherein the sun gear comprises thrust rings located on each side of the sun gear, wherein the thrust rings are arranged so that the planet gears of the gear reduction unit run between the thrust rings in use.

22. A drive unit according to any one of claims 1 to 13 comprising a gear change unit according to any one of claims 14 to 21.

23. A drive configuration for a skid steered vehicle comprising:

a respective drive member adapted to be located at each side of the vehicle, each drive member engaging with a track or wheel of the vehicle and operable to drive the tracks or wheels of the vehicle; and

a drive unit according to any one of claims 1 to 13 or 22, wherein each drive member is in driveable communication with an output of the drive unit.

24. A vehicle comprising a drive unit according to any one of claims 1 to 13 or 22, or a gear change unit according to any one of claims 14 to 21.