CLAIMS

1. A pedally propelled vehicle multi speed gear system (1) comprising a gear mechanism (4) comprising;
- a main shaft (5);
- a hollow first shaft (71) and a hollow second shaft (72a, 72b), both axially stationary and rotatably arranged about the main shaft (5);
- an epicyclical first gear section (10) arranged about the main shaft (5) between the first and second shafts (71, 72), and comprising two radially stacked carrier elements (101, 102),
- a first shift mechanism (30) arranged between the first shaft (71) and the first gear section (10), and configured to rotationally engage the first shaft (71) with either of the two radially stacked carriers (101, 102), wherein
the first shift mechanism (30) comprises two first clutches (321, 322) radially stacked about the main shaft (5), wherein the two first clutches (321, 322) have interfacing first and second clutch members, respectively, wherein the first clutch member of the two first clutches (321, 322) are fixed to the first shaft (71) and arranged to remain axially stationary relative the main shaft (5), and the second clutch members (351, 352, 353) of the two first clutches (321, 322), are rotatably connected to the two radially stacked carriers (101, 102), respectively, wherein the first clutch members of the two first clutches (321, 322) is an integrated, first common clutch element (350), and further integrated with the first shaft (71).

2. A pedally propelled vehicle multi speed gear system (1) of any of the claims above, comprising;
- a second shift mechanism (40) arranged between the first gear section (10) and the second shaft (72a, 72b) configured to rotationally engage the second shaft (72a, 72b) with either of the two radially stacked carriers (101, 102), wherein
- the second shift mechanism (40) comprises two second clutches (421, 422) radially stacked about the main shaft (5).

3. A pedally propelled vehicle multi speed gear system (1) of claim 2,
wherein the two second clutches (421, 422) have first and second interfacing clutch members, respectively, wherein the first clutch members of the two second clutches (421, 422) are fixed to the second shaft (72a, 72) and arranged to remain axially stationary relative the main shaft (5), and the second clutch members of the two second clutches (421, 422), are rotatably connected to the two radially stacked carriers (101, 102), respectively.

4. The pedally propelled vehicle multi speed gear system (1) of claim 3, wherein the first clutch members of the two first clutches (421, 422) is an integrated, second common clutch element (450) and the second common clutch element (450) is integrated with the second shaft (72a, 72b).

5. The pedally propelled vehicle multi speed gear system (1) of any of claims 2 to 4, wherein the second shift mechanism (40) comprises an axially movable second shift element (410), configured to shift the outer of the second clutch members axially from an engaged position to a disengaged position without axially moving the inner clutch member.

6. The pedally propelled vehicle multi speed gear system (1) of claim 5, wherein the second common clutch element (450) comprises a radially extending shift opening (409) through the first clutch members, arranged to host the second shift element (410), wherein the second shift element (410) is arranged in the shift opening (409) between the second common clutch element (450) and the first clutch members.

7. The pedally propelled vehicle multi speed gear system (1) of any of claims above, comprising a shift axle (2) comprising a first shift cam (311) with multiple radial levels, wherein each level has a specific radius, wherein the main shaft (5) comprises a first opening (313) and the multilevel first radial shift cam (311) is arranged to operate the first shift mechanism (30) through the first opening (313), wherein the inner of the second clutch members is interfacing the outer of the second clutch members, and is arranged to operate the outer of the second clutch members axially from an engaged position to a disengaged position when the first radial shift cam (311) moves from an lower to a higher level.

8. The pedally propelled vehicle multi speed gear system (1) of any claim 7, wherein the second shift mechanism (40) comprises a second shift element (410), and the shift axle (2) comprises a second shift cam (411) with multiple radial levels where each level has a specific radius, wherein the main shaft (5) comprises a second opening (413) and the multilevel second radial shift cam (411) is arranged to operate the second shift mechanism (40) through the second opening (413), wherein the second shift element (410) is interfacing the outer of the second clutch members, and is arranged to operate the outer of the second clutch members axially from an engaged position to a disengaged position when the second radial shift cam (411) moves from a lower to a higher level.