CLAIMS

1. A cleaning vehicle for cleaning a surface of an object comprising:

first and second carriages;

first and second wheels coupled to the first and second carriages, respectively, for placement along a top surface of the object;

at least one motor operatively coupled to at least one of the first and second wheels to define a drive assembly;

a cleaning element extending between and being supported by the first and second carriages;

third and fourth wheels; and

a first adjustable couple that is coupled to the first carriage and a second adjustable couple that is coupled to the second carriage, in which the first adjustable couple defines a first spacing between the first carriage and the third wheel and the second adjustable couple defines a second spacing between the second carriage and the fourth wheel, the first and second spacings being sized to receive at least a portion of the object to position the vehicle on the surface to be cleaned;

in which the cleaning element is disposed one side of an axis passing through centrally through the first and second wheels and spaced therefrom by a first distance;

in which the third and fourth wheels are disposed on an opposite side of the axis and spaced therefrom by a second distance.

2. A cleaning vehicle according to Claim 1, in which the object comprises a solar panel and the surface comprises a top surface thereof and the first and second wheels and the cleaning element contact the surface to be cleaned.

3. A cleaning vehicle according to Claim 2, in which the solar panel further includes a bottom surface and a pair of opposing side surfaces that extend between the top and bottom surfaces.

4. A cleaning vehicle according to Claim 3, in which the third traveler wheel seats against both one side surface and the bottom surface and the fourth wheel seats against both the other side surface and the bottom surface.

5. A cleaning vehicle according to Claim 1, in which each of the third and fourth wheels has one of a concave shape and a V-shape.

6. A cleaning vehicle according to Claim 1, further including an axle extending between the first and second carriages and coupled to the first and second wheels, in which the motor is configured to rotate the axle so as to cause the first and second wheels to rotate in a first direction.

7. A cleaning vehicle according to Claim 6, in which the motor is mounted to one of the first and second carriages.

8. A cleaning vehicle according to Claim 1, in which the first and second adjustable couples are configured such that altering the first and second spacings between the first and second carriages and the third and fourth wheels, respectively, causes the cleaning element to rotate about the axle.

9. A cleaning vehicle according to Claim 6, in which the cleaning element is cantilevered relative to a front side of the vehicle with respect to the axle and the first and second wheels causing the vehicle to be front heavy.

10. A cleaning vehicle according to Claim 1, in which the cleaning element comprises a brush with bristles.

11. A cleaning vehicle according to Claim 6, in which the cleaning element is operatively coupled to the axle so that rotation of the axle is translated into rotation of the cleaning element.

12. A cleaning vehicle according to Claim 6, in which the operative coupling between the cleaning element and the axle is accomplished with a transmission system that couples the axle to the cleaning element such that power from the at least one motor rotates both the first and second wheels and the cleaning element.

13. A cleaning vehicle according to Claim 6, in which the transmission system includes a gear connected to the axle and a belt drive system that couples the cleaning element to the gear such that rotation of the axle is translated into rotation of the gear which in turn causes the belt drive system to rotate resulting in rotation of the cleaning element.

14. A cleaning vehicle according to Claim 1, in which the first and second wheels rotate in a first direction, while the cleaning element rotates in an opposite second direction.

15. A cleaning vehicle according to Claim 1, in which when the vehicle is driven in a forward direction, torque required to accelerate the vehicle is less than torque required to rotate the cleaning element and therefore, as the vehicle drives forward, the vehicle dives forward causing the cleaning element to be urged against the surface to be cleaned and conversely, when the vehicle is driven in a rearward direction, reverse torque directions causes the cleaning element to be lifted away from the surface to be cleaned.

16. A cleaning vehicle for cleaning a surface of an object comprising:

first and second carriages;

first and second wheels coupled to the first and second carriages, respectively, for placement along a top surface of the object;

at least one motor operatively coupled to one of the first and second wheels to define a drive assembly;

a cleaning element extending between and being supported by the first and second carriages at a location forward of the first and second wheels; and

third and fourth wheels, the third wheel being adjustably mounted relative to the first wheel and the fourth wheel being adjustably mounted relative to the second wheel, the third and fourth wheels being configured such that the object is received between the third and fourth wheels and the respective first and second carriages;

in which the first wheel is disposed between the cleaning element and the third wheel;

in which the second wheel is disposed between the cleaning element and the fourth wheel.

17. A cleaning vehicle according to Claim 16, in which the cleaning element is mounted in a cantilevered orientation relative to a front side of the vehicle with respect to an axle connecting the first and second wheels and the first and second wheels causing the vehicle to be front heavy and the third and fourth wheels are positioned to counteract a force generated by the cantilevered mounting of the cleaning element such that adjustment of the third and fourth wheels relative to the first and second wheels causes repositioning of the cleaning element relative to the surface to be cleaned.

18. A cleaning vehicle according to Claim 17, in which the third and fourth wheels are for placement against an underside of the object resulting in rotational force R2 about the axle that is in an opposite direction of the rotational force R1 about the axle caused by the cantilevered mounted cleaning element, thereby counteracting the rotational force R1 and preventing the cleaning element from completely resting on the surface to be cleaned due to gravitational force.

19. A cleaning vehicle according to Claim 16, further including a first adjustable couple that is coupled to the first carriage and a second adjustable couple that is coupled to the second carriage, in which the first adjustable couple defines a first spacing between the first carriage and the third wheel and the second adjustable couple defines a second spacing between the second carriage and the fourth wheel, the first and second spacings being sized to receive at least a portion of the object to position the vehicle on the surface to be cleaned.

20. A cleaning vehicle according to Claim 19, in which each of the first and second adjustable couples includes a first frame member fixedly attached to one of the respective first and second carriages and a movable second frame member, in which a distance between the first and second frame members can be varied by altering a position of the second frame member relative to the first frame member, the second frame member carrying one of the third and fourth wheels, in which adjustment of the distance between the first and second frame members translates into rotation of the respective first or second carriage about the axle resulting in lowering or raising of the cleaning element.