CLAIMS

1. A clean air apparatus comprising clean air means comprising a fan configured to~~for~~ produc~~ing~~ a flow of clean air and for discharging the clean air from an outlet and towards a target clean area, wherein at least a part of a periphery of the outlet is provided with a Coanda effect device comprising a profiled convex surface along which the flow of clean air passes, ~~disposed at least adjacent the clean air means and arranged,~~ in use, to induce a Coanda effect upon the flow of clean air, and a substantially planar guide means for guiding the clean air, in the form of an air curtain, towards the target clean area on an internal side of the apparatus, to separate air in the target clean area from air on an external side of the apparatus.

2. An apparatus according to claim 1, wherein the guide means is adapted to create an air curtain around the periphery of the clean area.

3. An apparatus according to claim 2, wherein the air curtain prevents unfiltered air from becoming entrained therein and contaminating the clean area.

4. An apparatus according to any preceding claim, wherein the clean air means discharges the clean air across the entire target clean area and the outer periphery thereof comprises air which is travelling at an increased speed compared to that of the clean air inside the clean area.

~~5. An apparatus according to any preceding claim, wherein the apparatus is incorporated into a hospital's ultra clean ventilation (UCV) system.~~

~~6. An apparatus according to any one of claims 1-4, wherein the apparatus is used in a manufacturing plant of a pharmaceutical product or a semiconductor.~~

~~7. An apparatus according to any preceding claim, wherein at least a part of the periphery of the outlet is provided with the Coanda effect device.~~

~~8~~5. An apparatus according to any preceding claim, wherein substantially all of the periphery of the outlet is provided with the Coanda effect device.

~~9~~6. An apparatus according to any preceding claim, wherein the clean air means comprises an air filter, and the fan blows the unclean air therethrough ~~through which unclean air is passed in order~~ to create the flow of clean air.

~~10. An apparatus according to claim 9, wherein the clean air means comprises a fan which blows the unclean air through the filter to create the flow of clean air.~~

~~11~~7. An apparatus according to any preceding claim, wherein the outlet comprises a diffuser, through which the flow of clean air is discharged towards the target clean area.

~~12. An apparatus according to any preceding claim, wherein the Coanda effect device comprises a profiled convex surface along which the flow of clean air passes.~~

~~13~~8. An apparatus according to any preceding claim ~~10~~, wherein the profiled convex surface comprises or forms at least a quarter portion of the circumference of a circle.

~~14~~9. An apparatus according to any preceding claim, wherein the profiled convex surface comprises or forms at least half, or substantially all, of the circumference of a circle.

~~15~~10. An apparatus according to any preceding claim, wherein the Coanda effect device is disposed so that, in use, it is at least partially downstream of the outlet, thereby presenting the profiled convex surface to the flow of clean air discharged from the outlet.

~~16. An apparatus according to any preceding claim, wherein the guide means comprise a substantially planar guide vane.~~

~~17~~11. An apparatus according to any preceding claim ~~16~~, wherein the guide vane is at least 2cm in length, or at least 5cm, or at least 10cm or at least 15cm in length.

~~18~~12. An apparatus according to any preceding ~~either~~ claim ~~16 or claim 17~~, wherein the guide vane is between about 15cm and 20cm long.

~~19~~13. An apparatus according to any preceding claim, wherein the apparatus comprises a housing configured to be attached to a ceiling and thereby define a canopy over the target clean area and the guide means extends in a direction from an inner or internal side of the canopy to an outer or external side thereof disposed adjacent thereto.

~~20~~14. An apparatus according to any preceding claim, wherein where the clean air apparatus is secured to a ceiling, it is arranged such that the flow of clean air is discharged substantially downwards towards the target clean area.

~~21~~15. An apparatus according to any preceding claim, wherein the guide means extends tangentially away from the profiled convex surface at an angle of between about 1° and 30°, or between about 2° and 25°, or between about 5° and 20°, or between about 7° and 15°, with respect to a vertical plane.

~~22~~16. An apparatus according to any preceding claim, wherein the guide means extends at an angle of between about 8° and 12° with respect to a vertical plane.

~~23~~17. An apparatus according to any preceding claim, wherein the Coanda effect device is an internal blowing device, in which the Coanda air is blown towards an internal side of the apparatus or canopy.

~~24~~18. An apparatus according to any preceding claim, wherein the Coanda effect device is an external blowing device, in which the Coanda air is blown towards an external side of the apparatus or canopy.

~~25. An apparatus according to any preceding claim, wherein the Coanda effect device is a combined internal and an external blowing device in which Coanda air is blown towards both the internal and external sides of the canopy.~~

~~26~~19. An apparatus according to any preceding claim, wherein the Coanda effect device is capable of creating a passive Coanda effect.

~~27~~20. An apparatus according to any preceding claim, wherein the Coanda effect device is capable of creating an active Coanda effect.

~~28~~21. An apparatus according to any preceding claim, wherein the Coanda effect device is arranged to feed a second flow of clean air, which is passed over the profiled convex surface, such that it entrains the first flow of clean air, wherein the two flows of clean air are collectively discharged around the periphery of the target clean area.

~~29~~22. An apparatus according to claim ~~28~~21, wherein the second flow of clean air (i.e. Coanda air) is created by either the first clean air means or, alternatively, by a second, independent clean air means.

~~30~~23. An apparatus according to either claim ~~28~~ 21 or claim ~~29~~22, wherein the apparatus comprises feed means for feeding the second flow of clean air to at least adjacent the Coanda effect device, and preferably the profiled convex surface thereof, where it entrains the first flow of clean air.

~~31~~24. An apparatus according to claim ~~30~~23, wherein the feed means feeds the second flow of clean air into the Coanda effect device.

~~32~~25. An apparatus according to any one of claims ~~28~~21-~~31~~24, wherein the Coanda effect device comprises at least one aperture through which the second flow of clean air passes into a plenum chamber, which plenum chamber is created at least adjacent the profiled convex surface.

~~33~~26. An apparatus according to claim ~~32~~25, wherein the plenum chamber is created between the profiled convex surface and the clean air means.

~~34~~27. An apparatus according to either claim ~~32~~ 25 or claim ~~33~~26, wherein the plenum chamber comprises a wall, which extends towards, but is spaced apart from, the profiled convex surface, by a gap or slot through which the second flow of clean air is passed upon application of air pressure to the plenum chamber.

~~35~~28. An apparatus according to claim ~~34~~27, wherein the gap is between 0.5 and 3mm in diameter, or between 1mm and 2mm in diameter or height.

~~36~~29. An apparatus according to either claim ~~34~~ 27 or claim ~~35~~28, wherein the wall comprises a profiled concave surface.

~~37~~30. An apparatus according to any one of claims ~~34~~27-~~36~~29, wherein the slot through which the second flow of clean air passes is disposed on the internal side of the apparatus.

~~38~~31. An apparatus according to any one of claims ~~34~~27-~~36~~29, wherein the slot through which second flow of clean air passes is disposed on the external side of the apparatus.

~~39~~32. A hospital ultra clean ventilation (UCV) system comprising the clean air apparatus according to any preceding claim.

~~40~~33. A pharmaceutical manufacturing plant ventilation system comprising the clean air apparatus according to any one of claims 1-~~38~~31.

~~41~~34. A semiconductor manufacturing plant ventilation system comprising the clean air apparatus according to any one of claims 1-~~38~~31.

~~42~~35. A method for discharging clean air towards a target clean area in the form of an air curtain, the method comprising:-

(i) creating a flow of clean air by clean air means comprising a fan;

(ii) discharging the flow of clean air through an outlet;

(iii) passing the flow of clean air over a profiled convex surface of a Coanda effect device provided along at least a part of the periphery of the outlet thereby inducing a Coanda effect upon the flow of clean air ~~using a Coanda effect device disposed at least adjacent the clean air means~~; and

(iv) guiding the discharged clean air towards a target clean area, on an internal side of the guide means, in the form of an air curtain to separate air in the target clean area from air on an external side of the guide means.