

Claims

1. A transfer device for holding an object, the transfer device comprising:
a housing having a housing surface;
at least one inlet conduit having an inlet for introducing a gas into the at least one

5 inlet conduit;

a plurality of sets of outlet conduits, each set of outlet conduits being in fluid communication with the at least one inlet conduit and having a plurality of outlets for directing the gas out of the outlet conduits, wherein the respective outlets of the sets of outlet conduits are arranged in a direction along the housing surface and away from a
10 centre region relative to the respective sets of outlet conduits, so that a laminar gas that flows along the housing surface generates a pressure differential which creates a force towards the centre region to hold the object against the housing surface.

2. The transfer device of claim 1, wherein the outlets of the respective sets of outlet
15 conduits are circumferentially arranged with respect to the centre region.

3. The transfer device of claim 1, wherein the at least one inlet conduit branches into a plurality of secondary inlet conduits, and each secondary inlet conduit further branches into a respective set of outlet conduits.

4. The transfer device of claim 3, wherein each secondary inlet conduit comprises an internal volume that is larger than each of the outlet conduits.

5. The transfer device of claim 1, wherein the outlet conduits of each set of outlet
25 conduits are radially arranged in a direction along the housing surface.

6. The transfer device of claim 5, wherein the respective outlets of each set of outlet conduits are arranged along an arc of 90 degrees.

7. The transfer device of claim 1, wherein the outlet conduits of each set of outlet
30 conduits are arranged in parallel.

8. The transfer device of claim 7, wherein the respective outlets of each set of outlet
35 conduits are arranged along a line.

9. The transfer device of claim 1, further comprising a stopper mounted to the housing surface, the stopper being for resting the object against, wherein the stopper defines a separation distance from the housing surface, so that the pressure differential is generated between the housing surface and an opposing surface of the object.

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10. A gang picker comprising:

a manifold having at least one manifold inlet for introducing a gas into the manifold and a plurality of manifold outlets for directing the gas out of the manifold, and a plurality of the transfer devices of claim 1,

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wherein the manifold outlets are connected to respective inlets of the inlet conduits of the transfer devices, so that the gas which is directed out of the manifold subsequently flows into the respective inlet conduits of the transfer devices.

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11. The gang picker of claim 10, wherein the manifold outlets are arranged at different levels relative to a top surface of the manifold, such that the manifold outlet that is nearest to the at least one manifold inlet is arranged at a lowest level and the manifold outlet that is farthest from the at least one manifold inlet is arranged at a highest level.

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12. The gang picker of claim 10, wherein the manifold further comprises a plate to form a sealed enclosure between the at least one manifold inlet and the plurality of manifold outlets.

Claims

1. A transfer device for holding an object, the transfer device comprising:

a housing having a housing surface;

5 at least one inlet conduit having an inlet for introducing a gas into the at least one inlet conduit;

a plurality of secondary inlet conduits connected to the at least one inlet conduit;

a plurality of sets of outlet conduits being in fluid communication with the at least one inlet conduit, wherein each set of outlet conduits comprises:

10 a plurality of outlet conduits that branches out radially from a respective secondary inlet conduit away from a single center region relative to the plurality of sets of outlet conduits,

wherein axes of the plurality of outlet conduits, that branches out radially from the respective secondary inlet conduit, diverge from a single point located within the housing; and

15 a plurality of outlets for directing the gas out of the outlet conduits and away from the single center region relative to the plurality of sets of outlet conduits,

wherein the respective outlets of the sets of outlet conduits are arranged in a direction along the housing surface and away from the single center region relative to the plurality of sets of outlet conduits, so that a laminar gas flow, comprising a sheet of gas, that flows out from the outlets and away from the single center region flows parallel to the housing surface such that a pressure differential is generated which creates a force towards the single center region to hold the object against the housing surface, the plurality of sets of outlet conduits are arranged parallel to the single center region, and

20 all of the plurality of outlets direct the gas out of the outlet conduit away from the single center region.

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2. The transfer device of claim 1, wherein the outlets of the respective sets of outlet conduits are circumferentially arranged with respect to the center region.

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3. The transfer device of claim 1 or claim 2, wherein the at least one inlet conduit branches into a plurality of secondary inlet conduits, and each secondary inlet conduit further branches into a respective set of outlet conduits.

4. The transfer device of claim 3, wherein each secondary inlet conduit comprises an internal volume that is larger than each of the outlet conduits.

5. The transfer device of any one of the preceding claims, wherein the outlet conduits of each set of outlet conduits are radially arranged in a direction along the housing surface.

6. The transfer device of claim 5, wherein the respective outlets of each set of outlet conduits are arranged along an arc of 90 degrees.

7. The transfer device of any one of the preceding claims, wherein the single center region is bounded by parallel sides of the housing.

8. The transfer device of any one of the preceding claims, wherein each of the secondary inlet conduits branches out radially from the single center region.

9. The transfer device of any one of the preceding claims, further comprising a stopper mounted to the housing surface, the object being placed against the stopper, wherein the stopper defines a separation distance from the housing surface, so that the pressure differential is generated in the separation distance between the housing surface and an opposing surface of the object.