- an activating element for manipulating the distance between the surface and the positioning means, the activating element being connected to the positioning means,

wherein the magnetic positioning means are movable between at least a first state wherein the head ~~moves freely~~is in a free movable state, and an active second state wherein the head is ~~movable~~ movably connected to the surface and can be put to operation, and

further comprising rotating means such that the nozzles are rotatable around the magnetic positioning means~~.~~, and wherein the cleaning head is integrally provided with the magnetic positioning means, such that the capability to follow a curvature of the surface is provided.

By providing magnetic positioning means, including both ferromagnetic and electromagnetic positioning means, a cleaning head can be positioned relative to the surface to be cleaned. This surface to be cleaned can be above or below water and may comprise a ships's hull, a tank surface, doors or gates for ships lock, and relatively static constructions in the offshore industry. The fouling on these structures increases drag forces on the structure and deterioration of the coating and construction. Cleaning involves removal of fouling, paint, surface layers, etc. Regular cleaning according to embodiments of the present invention would decrease environmental loads and the need for maintenance of the parts of the construction being exposed to the environment.

By providing an activating element the distance between the surface and the positioning means can be manipulated. The activating element moves the positioning means between at least two different states. In a first state, the cleaning head moves freely from the surface and can be positioned at a surface location requiring cleaning for example. In an active second state the actual cleaning of the surface is performed, wherein the cleaning head can be put to operation. In this second state the magnetic

may increase the surface area that can be cleaned in one position of the cleaning head.

The cleaning head further comprises rotating means such that the nozzles are rotatable around the magnetic positioning means. By having the nozzles rotated when the cleaning head is in use a larger surface area can be cleaned. Preferably the nozzles are provided on a ring that rotates around these magnetic positioning means.

~~Preferably, t~~The cleaning head is integrally provided with the positioning means. By integrally providing the magnetic positioning means may provide the capability to follow the curvature of the surface. For example, such curvature is relevant for a ship's hull. This may significantly improve the applicability of the cleaning head according to the invention.

According to embodiments of the invention the functions of cleaning curved surfaces and the attachment of the device to the surface are combined. Due to the integration of cleaning technology with magnetic attachment means, embodiments of the present invention may provide a solution for the specific requirements when cleaning surfaces, especially including curved surfaces, while the device may be able to achieve high cleaning speeds and may optionally be optimized to capture the removed debris as well.

In an advantageous preferred embodiment according to the present invention the activating element comprises a hydraulic or pneumatic control cylinder wherein the positioning means is movable between the at least first and second state.

By providing a pneumatic or hydraulic cylinder the air gap between the magnetic element of the positioning means and the surface to be cleaned can be controlled. In the first state, the air gap is relatively large such that the

CLAIMS

1. Cleaning head for cleaning a surface, such as a ship's hull, the cleaning head comprising:

- a frame comprising a nozzle shaft;
- one or more nozzles for cleaning the surface that are directly or indirectly connected to the nozzle shaft of the frame for providing a fluid to the surface to be cleaned;
- magnetic positioning means for positioning the head relative to the surface that are provided or attached to the frame; and
- an activating element for manipulating the distance between the surface and the positioning means, the activating element being connected to the positioning means,

wherein the magnetic positioning means are movable between at least a first state wherein the head ~~moves freely~~ is in a free movable state, and an active second state wherein the head is ~~movable~~ movably connected to the surface and can be put to operation, and

further comprising rotating means such that the nozzles are rotatable around the magnetic positioning means~~.~~, and wherein the cleaning head is integrally provided with the magnetic positioning means, such that the capability to follow a curvature of the surface is provided.

~~2. Cleaning head according to claim 1, wherein the cleaning head is integrally provided with the positioning means.~~

~~3~~2. Cleaning head according to claim 1 ~~or 2~~, wherein the activating element comprises a hydraulic or pneumatic controlled cylinder for moving the positioning means between the at least first and second state.

~~4~~3. Cleaning head according to claim 1~~,—2~~ or ~~3~~2, wherein the positioning means comprises a permanent magnet and wherein at least one side of the magnet is provided with a metal strip.

~~5~~4. Cleaning head according to any of the foregoing claims, wherein the positioning means is provided at or around a shaft.

~~6~~5. Cleaning head according to claim ~~5~~4, wherein a supply for the activating element is positioned in the internal of the shaft.

~~7~~6. Cleaning head according to one or more of the foregoing claims, wherein the rotating means comprise a rotatable housing with arms to which the nozzles are attached.

~~8~~7. Cleaning head according to claim ~~7~~6, wherein the spray nozzles are provided at a non-perpendicular angle to the surface such that in operation a rotating movement is achieved when the cleaning head is in use.

~~9~~8. Cleaning head according to one or more of the foregoing claims, further comprising three support-and-moving means with the three support-and-moving means optionally comprising connecting means to connect to a power source.

~~10~~9. Cleaning head according to one or more of the foregoing claims, further comprising suction means to remove loose parts.

~~11~~10. Cleaning device for cleaning a surface, such as a ship's hull, comprising:

- a frame with one or more cleaning heads according to one or more of the foregoing claims; and
- a drive for moving the device.

~~12~~11. Cleaning device according to claim 10, further comprising a unit which is provided with one or more cleaning heads and comprising a combined suspension.

~~13~~12. Cleaning device according to claim 10 or 11, further comprising inspection means and/or paint spray means.

~~14~~13. Cleaning device according to claim ~~13~~12, wherein ~~the~~ a suction means is incorporated in a housing.

~~15~~14. Method for cleaning a surface, such as a ship's hull, comprising the steps of:

- providing a cleaning device according to one or more of the foregoing claims ~~11-14~~10-13;
- positioning the device on the surface; and
- cleaning the surface.