

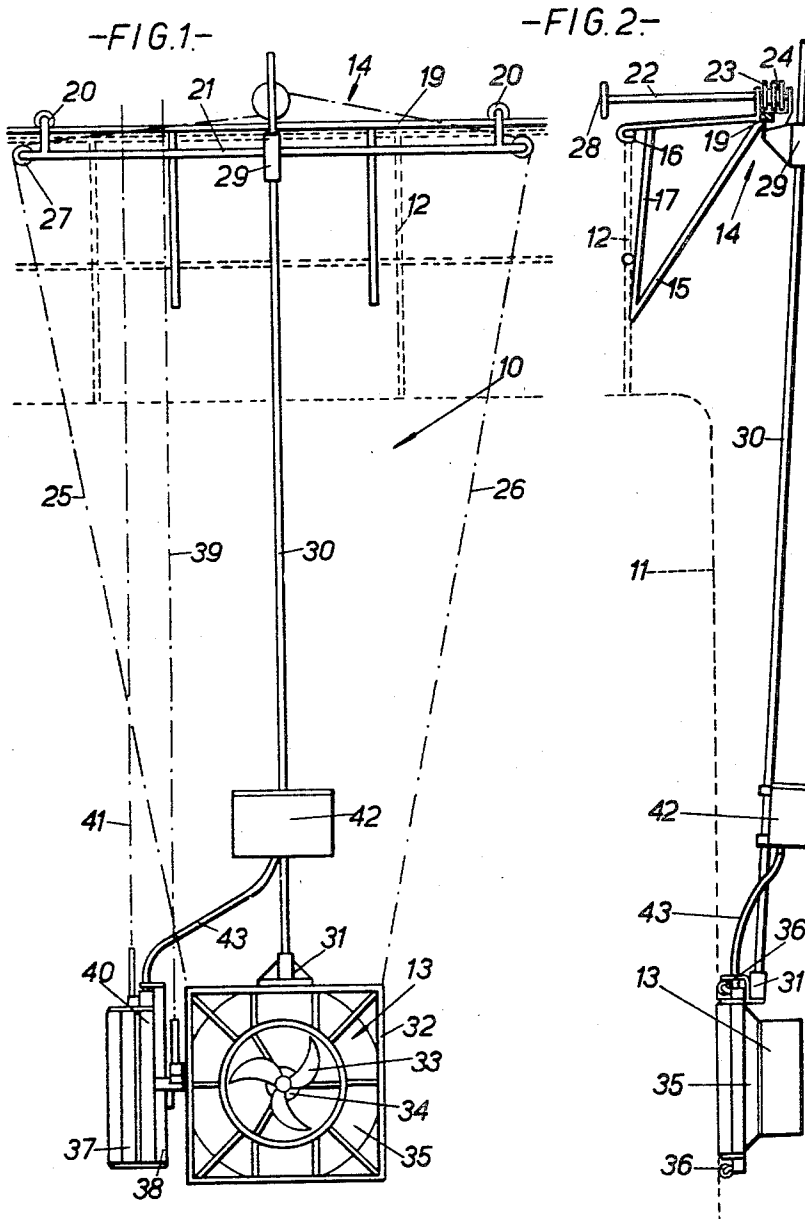
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DEVICE FOR TREATING LARGE AREA SURFACES

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**DEVICE FOR TREATING LARGE  
AREA SURFACES**  
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This invention relates to apparatuses for treating surfaces, especially for painting, brushing or similarly treating large surfaces, such as the vertical surfaces of ships' hulls.

According to the present invention an apparatus for treating surfaces of large area comprises suspension means adapted for mounting adjacent a surface to be treated and, supported thereby, means for producing a current of air away from the surface and having an air intake adapted to be arranged in close proximity thereto, and means associated with the air current-producing means for treating the surface by making positive contact therewith, said suspension means being operable to cause joint displacement of said air current-producing means and said surface-treating means in two directions at right angles to one another over the surface, the arrangement being such that a force of reaction resulting from the current of air is supplemented by a suction force arising from the disposition of the intake whereby the combined forces are able jointly to urge the air current-producing means and the surface-treating means against the surface to be treated, while the suction force enables relatively loose matter to be removed from the surface.

Preferably, the means for producing a current of air is an electric fan having as its intake a frusto-conical shade which is adapted to be arranged with its larger annular peripheral edge directed towards the surface to be treated and in close proximity thereto, the major of the two combined forces being the suction force produced by the fan between said edge and said surface.

Conveniently, the suspension means comprises fixed guide means extending parallel to the plane of the surface and means for supporting the air current-producing means and the surface-treating means, which supporting means is horizontally displaceable along said guide means and adjustable to displace said air current-producing means and said surface-treating means towards and away from said surface and vertically towards and away from said guide means.

In order that the invention can be more clearly understood, a convenient embodiment thereof will now be described, by way of example, with reference to the accompanying drawings, in which:

FIGURE 1 is a front elevation of the apparatus constructed in accordance with the invention, shown in position on a ships' hull, and

FIGURE 2 is a side view of the apparatus shown in FIGURE 1.

Referring to the drawings, the outer surface 11 of ship's hull and a guard rail 12 are shown in dotted lines, while a fan 13 for treatment of substantially vertical or inclined surfaces, is shown suspended on the rail 12, which fan is horizontally and vertically adjustable by means of a suspension arrangement 14.

The suspension arrangement 14 comprises a rack 15 including a stirrup 16 which is adapted to engage the top of the rail 12 or, for example, the top of a bulwark, and a base member 17 which is adapted to rest against the rail, a lower horizontal pipe or the bulwark. To the rack 15, there is secured a rail 19 which forms a guide for the traversing wheels 20 on a horizontally displaceable yoke 21. Centrally of the yoke 21, a shaft 22 is mounted with two spools 23, 24 for respective supporting

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lines 25, 26 which pass over pulleys 27, each at a respective end of the yoke 21, and down to a fastening on the fan 13. The shaft 22 is turned by means of a hand wheel 28 and can be locked in desired positions by means of a locking arrangement (not shown) on the yoke 21. In a tubular guide 29 on the yoke 21, a reinforcing pipe 30 is received, the lower end of which is fixed to a ferrule 31 on the fan 13.

On adjusting the fan 13 for height, the lines 25, 26 are let out or drawn in uniformly with respect to each other, so that the fan can be displaced substantially vertically and at right angles on the yoke 21. The reinforcing pipe 30 will assist in guiding the fan in a straight line movement relative to the yoke.

In order to prevent the fan from sliding against the side of the ship during the vertical adjustment, the fan is adapted to be held at a distance from the side of the ship when it is in use and, as shown in FIGURE 2, the yoke 21 on this occasion is suspended a distance outside the side of the ship, so that the gravitational force of the fan will normally pivot the latter outwards from the surface 11. Owing to the guide 29 for the reinforcing pipe 30 being pivotably mounted on the yoke 21 or owing to the yoke being pivotably suspended on the rail 19 above the wheels 20, about an axis running parallel to the longitudinal axis of the yoke, the fan 13 can be pivoted manually against the side of the ship by means of the upper end of the pipe 30.

The fan 13 is provided with a frame 32 in which are secured fan blades 33 which are driven by a motor 34. In order to pivot the fan 13 inwards towards the side of the ship and especially in order to maintain the fan pressed against the side of the ship, the fan blades 33 are adapted to direct a jet of air outwards so that the fan when suspended at a distance from the surface 11, can be guided inwards towards the ship's hull by the force of reaction. In order to ensure that the fan is maintained pressed with sufficient pressure against the ship's hull, a circular shade 35 is positioned around the intake of the fan, with the widest portion of the shade directed towards the side of the ship and, in the rest position of the fan, preferably located rather close up to the surface which is to be treated, for example, at a distance of about 1 cm. from the surface. In this way, there is obtained, in addition to the force of reaction from the outwardly directed air jet, a considerable suction force which draws the fan inwards towards the surface. By means of this suction effect, relative loose dust or the like can also be drawn off the surface 11.

In each corner of the frame 32 which is shown square, there are located wheels 36 which are mounted about a first axis parallel to the surface 11 and about a second axis which extends at right angles or substantially at right angles to the surface 11, so that the frame can roll freely against the surface 11 in arbitrary directions.

In this embodiment, the apparatus is designed to be used for painting the surface 11 and it is for this reason that a paint roller 37, having a width which corresponds substantially to the width of the fan, is pivotably mounted on the latter. The roller 37 is secured just at the rear of the fan 13, reckoned in its path of movement. The roller is mounted in a bowed stand 38 which can be pivoted about a first axis parallel to the paint roller to enable the latter to be pivoted towards and away from the side of the ship relative to the apparatus and, in addition, about a second axis which extends at right angles to the first axis and parallel to the surface 11. At 39 there is shown a guide wire for regulating the position of the paint roller relative to the first axis. At 40 there is shown an arrangement for supplying paint to the roller 37 in definite amounts. The supply to the roller 37 is regulated

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by means of a draw cord 41. The paint is received in a container 42 and is led through a conduit 43 to the feed arrangement 40.

Gradually as the fan and the paint roller are led forward along the surface 11, the fan will suck off the relatively loose dust particles from the surface before the paint roller 37 applies a coating of paint.

The apparatus can also be used, for example, for brushing off loose paint, rust or the like from the surface 11. In this case (not shown in the drawing), a motor-driven brush is placed just in front of the apparatus, reckoned in its path of movement. In this way, such particles which are loosened from the surface 11, but which have not been freed from the surface, can be removed from the latter by means of the air stream through the fan 13.

What I claim is:

1. An apparatus for treating surfaces of large area which comprises suspension means adapted for mounting adjacent a surface to be treated, means for producing a current of air away from the surface and having an air intake adapted to be arranged in close proximity thereto, and means associated with said air current-producing means for treating the surface by making positive contact therewith, said suspension means supporting said air current-producing means and said surface-treating means and comprising horizontal rail means, yoke means movable on said rail means, movable suspension means connecting said yoke means with said air current producing means for relative vertical movement, tubular guide means pivotally mounted on said yoke means, an elongated member secured at its lower end to said air current producing means with an upper portion thereof slidably mounted in said guide means, whereby said air current producing means may be moved horizontally, vertically and toward and away from said surface; the arrangement being such that a force of reaction resulting from the current of air is supplemented by a suction force arising from the disposition of the intake whereby the combined forces are able jointly to urge the air current-producing means and the surface-treating means against the surface to be treated, while the suction force enables relatively loose matter to be removed from said surface.

2. An apparatus for treating surfaces of large area which comprises suspension means adapted for mounting adjacent a surface to be treated, an electric fan for producing a current of air away from the surface and having an air intake in the form of a frusto-conical shade adapted to have its larger annular peripheral edge directed towards the surface and in close proximity thereto, and means coupled to said fan for treating the surface by making positive contact therewith, said suspension means supporting said fan and said surface treating means, said suspension means comprising combined means for moving said fan vertically and horizontally, and pivot means on said combined means for moving said fan toward and away from said surface, the arrangement being such that a force of reaction resulting from the current of air is supplemented by a suction force arising from the disposition of the intake whereby the combined forces are able jointly to urge the fan and the surface-treating means against the surface to be treated, while the suction force enables relatively loose matter to be removed from the surface, the major of the two combined forces being the suction force produced by the fan between said edge of the shade and said surface.

3. An apparatus according to claim 1, wherein the surface-treating means comprises a painting roller and means for supplying paint thereto.

4. An apparatus according to claim 2, wherein the surface-treating means comprises a painting roller and means for supplying paint thereto.

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5. An apparatus according to claim 1, wherein the surface-treating means comprises a power-driven brush.

6. An apparatus according to claim 2, wherein the surface-treating means comprises a power-driven brush.

7. An apparatus for treating surfaces of large area which comprises suspension means adapted for mounting adjacent a surface to be treated, means for producing a current of air away from the surface and having an air intake adapted to be arranged in close proximity thereto, and means associated with said air current-producing means for treating the surface by making positive contact therewith, said suspension means comprising fixed guide means extending parallel to the plane of the surface and means for supporting the air current-producing means and the surface treating means, which supporting means is horizontally displaceable along said guide means and pivotally adjustable means on said supporting means to displace said air current-producing means and said surface-treating means towards and away from said surface and vertically towards and away from said guide means, the arrangement being such that a force of reaction resulting from the current of air is supplemented by a suction force arising from the disposition of the intake whereby the combined forces are able jointly to urge the air current-producing means and the surface-treating means against the surface to be treated, while the suction force enables relatively loose matter to be removed from the surface, the major of the two combined forces being the suction force.

8. An apparatus according to claim 7, wherein the supporting means comprises a yoke member which is horizontally displaceable along the guide means, a pair of supporting lines, control means arranged centrally of the yoke member engageable with said lines for vertical displacement of the air current-producing means and the surface-treating means by equal adjustment of the lengths of said lines, said lines being connected at one end thereof to the air current-producing means, the lines diverging upwardly from the latter and each passing smoothly over a corresponding one of the ends of the yoke member, and wherein the supporting means further comprises an elongated reinforcing element, one end of which is connected to the air current-producing means while the other end is slidably received by a tubular guide member carried by the yoke member, said reinforcing element serving to assist in guiding the air current-producing means and the surface treating means rectilinearly relative to the yoke member.

9. An apparatus according to claim 8, wherein the yoke member is mounted on the guide means so as to pivot about an axis parallel to its longitudinal axis and thereby turn the air current-producing means and the surface-treating means towards and away from the surface.

10. An apparatus according to claim 8, wherein the guide member is mounted on the yoke member so as to pivot axially thereof and thereby turn the air current-producing means and the surface treating means towards and away from the surface.

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