Dec. 1, 1959 A. L. WELLS 2,914,791

APPARATUS FOR DRYING WET SURFACES

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FIG. 1

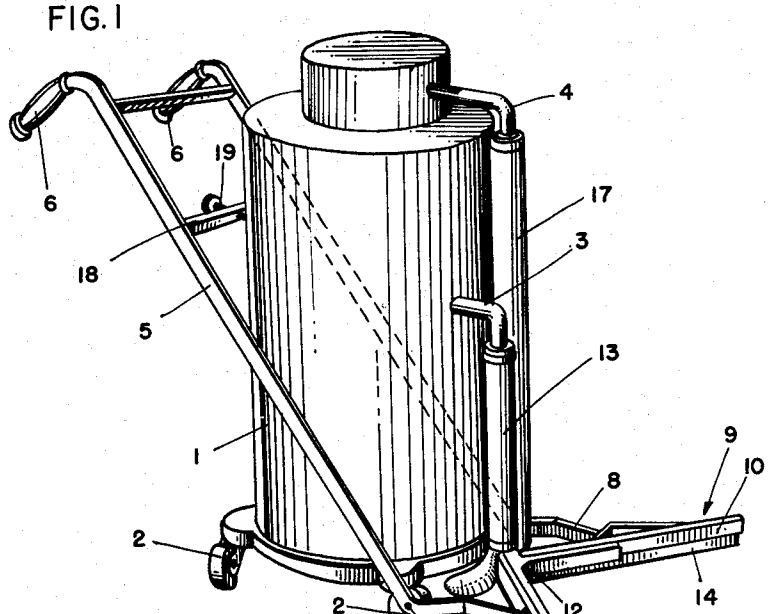


FIG. 2

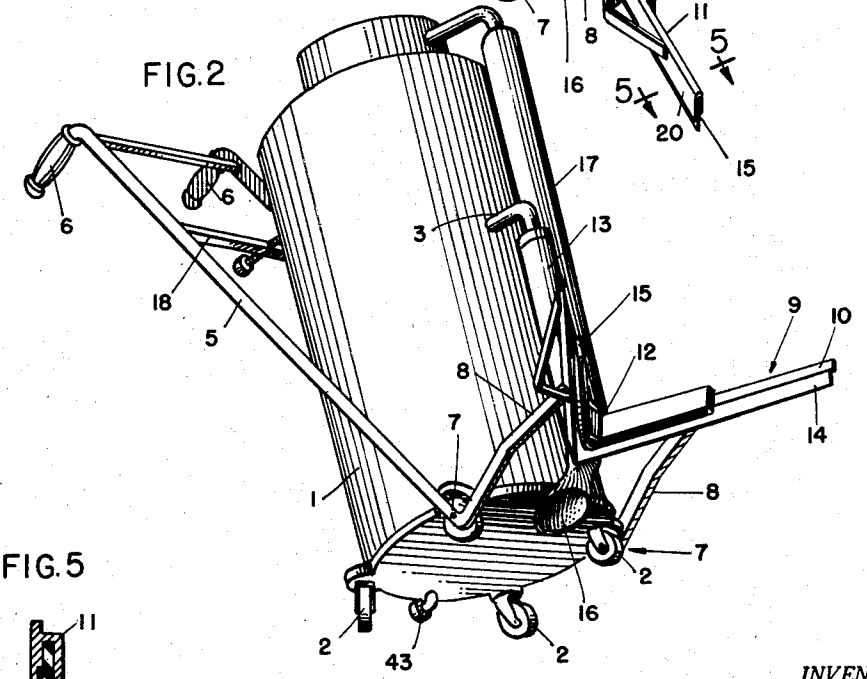
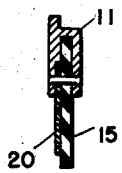


FIG. 5



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FIG. 3

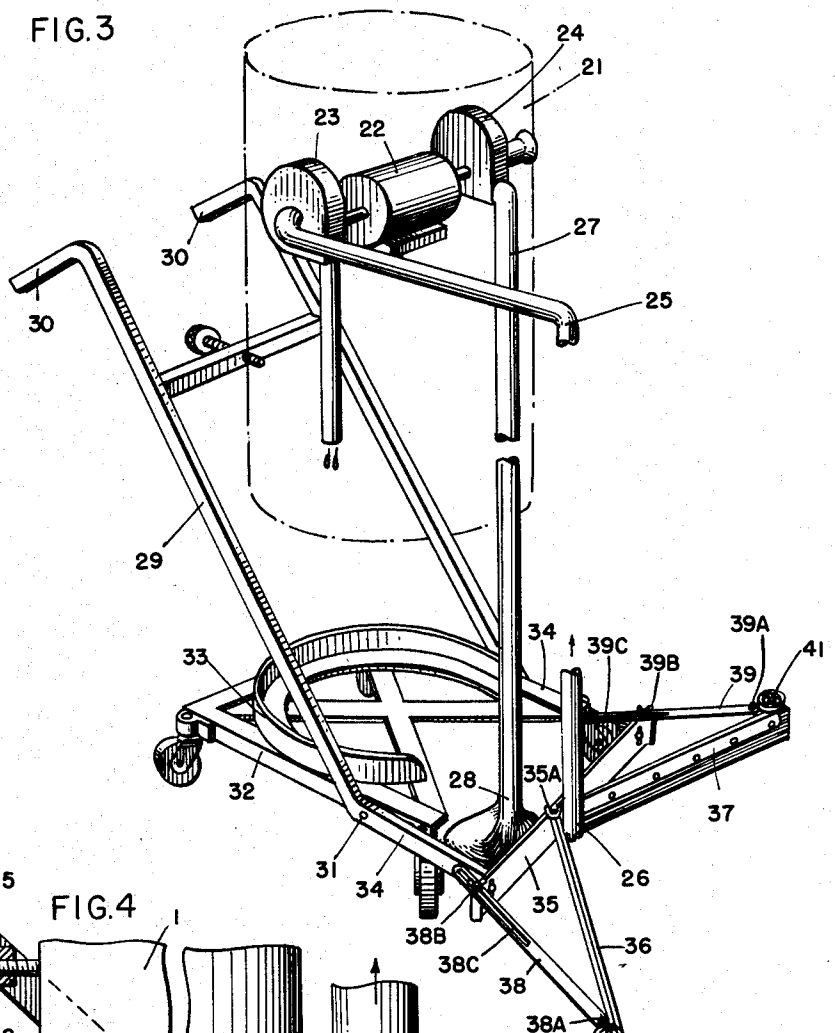
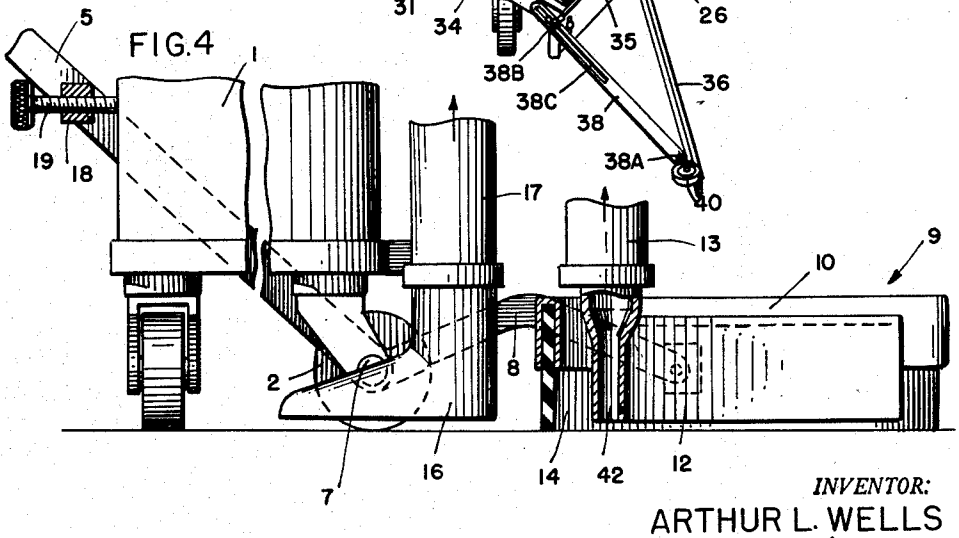


FIG. 4



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APPARATUS FOR DRYING WET SURFACES

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Application May 17, 1952, Serial No. 288,503

8 Claims. (Cl. 15—345)

This invention relates to improvements in the drying of wet surfaces and more particularly to a portable vacuum apparatus for picking up liquids from wet surfaces.

Certain surfaces are most conveniently cleaned by washing them with water or a cleaning solution. For example, terrazza, linoleum, marble and concrete floors may be cleaned by mopping or scrubbing, either by hand or with power scrubbers. The floors are left wet by these methods and it is necessary to remove the water, soap and dirt from the floor in a separate operation. It is known to remove these elements by sucking them up through the nozzle of a vacuum unit of the type similar to a conventional vacuum cleaner of the stationary body and movable nozzle type. This method is not satisfactory for large surfaces because the nozzle must necessarily be small and it must be held close to the wet surface at all times. As a result it requires considerable labor and time to remove all of the water from a large floor.

It is an object of this invention to provide a portable vacuum type drying apparatus which is capable of drying a large wet surface quickly and efficiently.

Another object of the invention is to provide an attachment for converting a vacuum cleaner to a drying apparatus for large wet surfaces.

A further object of the invention is to provide a portable adjustable attachment for a vacuum cleaner which makes the cleaner effective to pick up liquids and to dry a wet surface.

The foregoing and numerous other important objects, advantages, and inherent functions of the invention will become apparent as the same is more fully understood from the following description, which taken in connection with the accompanying drawings, discloses a preferred embodiment of the invention.

In the drawings:

Figure 1 is a perspective view of one embodiment of an apparatus according to this invention;

Figure 2 is a perspective view looking upwardly toward the bottom of the apparatus;

Figure 3 is a diagrammatic view of another embodiment of the invention;

Figure 4 is a detailed fragmentary view partially in section of the attachments of the embodiment illustrated in Figure 1; and

Figure 5 is a sectional view taken along the lines 5—5 of Figure 1.

In the accomplishment of the foregoing objects and in accordance with the invention there is now provided an attachment for adapting a vacuum cleaner to dry a wet surface quickly and efficiently. The attachment comprises the combination of a converging squeegee, a vacuum nozzle associated with the squeegee and adapted to withdraw liquid from the converging portion of the squeegee. A second nozzle is connected to the discharge side of a vacuum cleaner and is adapted to discharge air onto the surface over which the squeegee has passed. The attachment preferably also includes a

pivoted handle means associated with the squeegee and the vacuum cleaner carriage in such a manner that it is adjustable to raise and lower the squeegee with respect to the carriage and the surface. The squeegee can have spring metal reinforcements at the tips thereof in order to urge the resilient portion of the squeegee against the surface to be dried.

One embodiment of this invention is the removable attachment comprising a wheeled carriage having the squeegee, suction and discharge nozzles and the handle attached thereto. The carriage is adapted to removably receive a vacuum cleaner of the tank type and the suction and discharge nozzles are attachable to the vacuum unit. It is contemplated also that the arms of the squeegee can be adjusted to any desired position to form any angle between 0° and 180° at the point of convergence of the arms. Hence, the squeegee may be adjusted to dry a strip of floor of any given width, for example, from one foot to four feet in width.

Referring to the drawings in detail it will be seen from Figures 1 and 2 that the apparatus comprises a conventional tank type vacuum cleaner **1** which may be readily transported from place to place on the wheels **2—2**. A vacuum cleaner of this type has a suction conduit **3** and a discharge conduit **4** attached thereto. An electric motor (not shown) drives pumping apparatus (not shown) which provides the suction to the conduit **3** and discharges through the conduit **4**. A trapping arrangement is customarily employed to remove the substances drawn in through the conduit **3** so that the air being discharged through the conduit **4** is relatively free of entrained materials.

In the practice of the invention I have now adapted the cleaner **1** for use in drying large surfaces by attaching thereto a transporting frame **5** having the handles **6—6** conveniently located thereon so that the portable vacuum cleaner can be pushed over the surface to be dried. The frame **5** is pivotally connected at the points **7** to the axles of each of the front pair of wheels **2** on the cleaner **1** and the forwardly extending portion **8—8** of the frame **5** projects in front of the cleaner **1** in order to support the squeegee **9**. The squeegee **9** is preferably made with the converging arms **10** and **11** so arranged as to form a V. At the apex of the V there is placed a suction nozzle **12** of substantially the same configuration and connected by means of the hose **13** to the suction conduit **3** on the cleaner **1**. The flexible rubber portions **14** and **15** on the arms **10** and **11** respectively are adapted to contact the wet surface and to "wipe" the water thereon towards the apex of the V. Here the water is sucked up through the nozzle **12** and discharged into the trap in the cleaner **1**. When the trap has become filled with water, it is possible to drain the water therefrom through the drain **43** (Fig. 2).

In order to assist in drying the surface after the squeegee has passed over it there is provided a nozzle **16** which is connected by means of the hose **17** to the discharge conduit **4**. The discharged air from the pump is thereby directed onto the floor or surface immediately after the squeegee has passed thereover and withdrawn substantially all of the water. The blast of air issuing from the nozzle **16** aids materially in drying the surface.

It will be observed in the drawings that the pivoted connection **7** by which the frame **5** is connected to the cleaner **1** provides a fulcrumed arrangement by which the squeegee **9** and the apparatus associated therewith may be raised or lowered from the wet surface. This is accomplished merely by forcing the handles **6—6** of the frame **5** downwardly. There is also provided a novel arrangement for adjusting the position of the squeegee **9** with respect to the surface. In this arrangement the

cross bar 18 extending between the parallel portions of the frame 5 is threaded to receive the adjusting screw 19. The inner end of the screw 19 is adapted to bear against the exterior of the cleaner 1 and it will be apparent that by advancing or retracting the screw 19, the position of the bar 18 with respect to the cleaner 1 will be changed. This movement is transmitted through the fulcrumed arrangement to the squeegee 9 and provides a means for making fine adjustments of the operating position of the squeegee with respect to the surface to be dried.

The flexible portions 14 and 15 of the squeegee 9 are of conventional design and are preferably made of rubber. At the tip of each portion 14 and 15 there is provided a strip of flexible metal 20 which extends almost to the edge of the rubber portion in order to urge the portion against the surface to be dried. This arrangement is shown in detail in Figure 5 wherein the strip 20 which is preferably of a spring metal, such as brass, provides resilient support for the rubber portion 15.

In Figure 3 there is illustrated a diagrammatic arrangement in which another embodiment of the invention is shown as comprising a device which is adapted for use with any suitable tank type vacuum cleaner. In the drawing the cleaner is illustrated diagrammatically as comprising a tank 21, a motor 22, a suction pump 23 and an air blower 24. It will be apparent, of course, that the pump and blower may be parts of the same unit. The pump 23 is connected by means of the conduit 25 to a suction nozzle 26 and the blower 24 is connected by means of the conduit 27 to the discharge nozzle 28. Essential parts of the arrangement according to the invention are the frame 29 having handles 30—30 at one end thereof and being pivoted at 31 to a wheeled carriage 32. The wheeled carriage may have a suitable retainer 33 for removably holding the vacuum apparatus thereon.

The forwardly extending arms 34—34 of the frame 29 have affixed thereto a cross bar 35 which is adapted to receive the converging ends of the arms 36 and 37 of the squeegee. The arms are pivoted at the center 35A on the bar 35 and are supported at their outer ends by means of the adjustable rods 38 and 39, respectively. The rods 38 and 39 are likewise pivoted at 38A and 39A, respectively, and supported at the ends of the bar 35 by means of the wing nut connections 38B and 39B. The rods are slotted at 38C and 39C so that they may be advanced or retracted on the bar 35 with the result that the arms 36 and 37 may be positioned with respect to one another so as to form any angle between 0° and 180° at their convergence. This arrangement makes it possible to adjust the width of the strip which the squeegee may effectively sweep. A pair of wheels or casters 40 and 41 are located horizontally at the ends of the squeegee arms 36 and 37 to provide an arrangement for preventing contact of the squeegee with a wall or with furniture. It will be observed with reference to the apparatus illustrated in Figure 3 that the carriage with the squeegee attached thereto is suitable for use with any tank type vacuum cleaner merely by connecting the suction nozzle 26 to the suction side of the cleaner and exhausting air from the cleaner through the nozzle 28.

The elements of the apparatus of Figures 1 and 2 are illustrated in considerable detail in the enlarged drawing in Figure 4. As shown therein the frame 5 passes alongside the cleaner 1 and is pivotally attached to the axle of the wheel 2. The forwardly extending portion 8 of the frame 5 is attached to an arm 10 of the squeegee 9. The flexible rubber portion or blade 14 is supported within the arm 10 and is adapted to contact the surface to be dried as the unit is wheeled forward. Water swept up by the portion 14 is delivered to the apex of the converging squeegee where it is drawn up through the opening 42 in the suction nozzle 12. Air is discharged under pressure through the nozzle 16 at a point immediately

behind the squeegee 9 and at a slight distance above the surface. This blast of air issues underneath the cleaner 1 and materially aids in completely drying the surface.

The position of the squeegee with respect to the surface may be changed at will by moving the handles of the frame 5 upwardly or downwardly. Fine adjustments of the position of the squeegee can be obtained by advancing or retracting the screw 19 against the outer surface of the cleaner 1.

The arrangement illustrated in Figures 1, 2 and 4 is so constructed and arranged that it can be attached to any suitable portable tank-type vacuum cleaner and thereby effectively converts the vacuum cleaner from a conventional dry cleaning unit to one which can be used to pick up water from a large wet surface. In such a case the frame, the squeegee and the suction and discharge nozzles may comprise a unit which can be attached to the cleaner. In the embodiment shown in Fig. 3 the assembly consists of a wheeled carriage, frame, squeegee and suction and discharge nozzles. Any tank type cleaner can be placed on the carriage and connected to the nozzles and thereby made into a portable water pick-up device for drying floors, etc.

Using the apparatus previously described in any one of its embodiments, I may effectively dry a large wet surface by pushing the wheeled apparatus over the surface with the blades of the squeegee in contact therewith. The water on the surface is directed towards the apex of the converging arms of the squeegee where it is drawn up through a suction nozzle and trapped within the cleaner. At the same time the discharge air from the cleaner is directed on the surface immediately following the passage of the squeegee thereover. In this manner one operator can dry several times the surface area that was previously possible for one man to dry with the old hand-operated suction device.

It is thought that the invention and its numerous attendant advantages will be fully understood from the foregoing description, and it is obvious that numerous changes may be made in the form, construction and arrangement of the several parts without departing from the spirit or scope of the invention, or sacrificing any of its attendant advantages, the forms herein disclosed being preferred embodiments of the invention.

The invention is hereby claimed as follows:

1. An adapter attachable to a vacuum cleaner in a mobile assembly of the two, which adapter includes a frame adapted to embrace a vacuum cleaner, pivot means intermediate the ends of said frame for attaching it to said cleaner for rotation relative thereto about a substantially horizontal axis, a squeegee on forwardly extending portions of said frame for wiping a surface, said squeegee being rotatable with said frame to raise and lower the squeegee with respect to said surface, handle means on rearwardly extending portions of said frame adapted to move said assembly over said surface and for rotating said frame and thereby said squeegee in unison, and additional means on said frame to limit pivotal movement thereof with respect to said cleaner, when the latter is assembled with the adapter, and adjustable to raise and lower the squeegee to a selected operating position with respect to said surface while allowing the squeege to be raised further by said handle means, said cleaner being utilized to create a suction zone adjacent said squeegee when the cleaner is assembled with the adapter.

2. A removable attachment for adapting a vacuum cleaner to dry a wet surface in a mobile assembly of the two, which attachment includes a frame having a rearwardly extending arm and a forwardly extending arm, pivot means intermediate the ends of said frame for removably attaching it to said cleaner for rotation relative thereto about a substantially horizontal axis, said rearwardly extending arm comprising handle means adapted to move said assembly over said surface and for rotating

said frame, an adjustable converging squeegee for wiping said surface mounted on said forwardly extending arm for rotation therewith, said squeegee having two angularly adjustable arms arranged to converge at their rear ends, means for securing said squeegee arms in a selected angular relationship, and a vacuum nozzle positioned adjacent the apex of said squeegee and adapted to be connected to the suction inlet of said cleaner when the cleaner is assembled with the attachment.

3. A removable attachment for adapting a vacuum cleaner to dry a wet surface in a mobile assembly of the two, which attachment includes a frame having a rearwardly extending arm and a forwardly extending arm, pivot means intermediate the ends of said frame for removably attaching it to said cleaner for rotation relative thereto about a substantially horizontal axis, said rearwardly extending arm comprising handle means adapted to move said assembly over said surface and for rotating said frame, an adjustable converging squeegee for wiping said surface mounted on said forwardly extending arm for rotation therewith, said squeegee having two angularly adjustable arms arranged to converge at their rear ends, means for securing said squeegee arms in a selected angular relationship, and additional means on said frame to limit pivotal movement thereof with respect to said cleaner, when the latter is assembled with the attachment, and adjustable to raise and lower the squeegee to a selected operating position with respect to said surface while allowing the squeegee to be raised further by said handle means, said cleaner being utilized to create a suction zone adjacent the apex of said squeegee when the cleaner is assembled with the attachment.

4. An attachment for adapting a vacuum cleaner to dry a wet surface which includes the combination of a portable carriage adapted for removably mounting said cleaner thereon, a frame pivotally mounted on said carriage for rotation relative thereto about a substantially horizontal axis, a squeegee for wiping said surface mounted on said frame for rotation therewith, handle means on said frame for moving said carriage over said surface and for rotating said frame and thereby said squeegee in unison, and additional means on said frame to limit pivotal movement thereof with respect to said cleaner, when the latter is mounted on the carriage, and adjustable to raise and lower the squeegee to a selected operating position with respect to said surface while allowing the squeegee to be raised further by said handle means, said cleaner being utilized to create a suction zone adjacent said squeegee when the cleaner is mounted on the carriage.

5. An attachment for adapting a vacuum cleaner to dry a wet surface which includes the combination of a carriage adapted for removably mounting said vacuum cleaner thereon, a converging squeegee mounted on said carriage for wiping said surface, said squeegee having two angularly adjustable arms arranged to converge at their inner ends, means for securing said arms in a selected angular relationship, handle means pivotally mounted on said carriage for moving it over said surface and coupled with said squeegee for raising and lowering it independently of said carriage on pivotal movement of the handle means, and a vacuum nozzle positioned adjacent the apex of said squeegee and adapted to be connected to the suction inlet of said cleaner when the cleaner is mounted on the carriage.

6. An attachment for adapting a vacuum cleaner to dry a wet surface which includes the combination of a carriage adapted for removably mounting said vacuum cleaner thereon, a converging squeegee mounted on said carriage for wiping said surface, said squeegee having two angularly adjustable arms arranged to converge at their inner ends, means for securing said arms in a selected angular relationship, handle means pivotally mounted on said carriage for moving it over said surface and coupled with said squeegee for raising and lowering it independently of said carriage on pivotal movement of the handle means, and means associated with said handle means to limit pivotal movement thereof with respect to said cleaner, when the latter is mounted on the carriage, and adjustable to raise and lower the squeegee to a selected operating position with respect to said carriage and said surface while allowing the squeegee to be raised further by said handle means, said cleaner being utilized to create a suction zone adjacent the apex of said squeegee when the cleaner is mounted on the carriage.

7. An attachment for adapting a vacuum cleaner to dry a wet surface which includes a wheeled carriage adapted for removably mounting said cleaner thereon, a frame having a rearwardly extending arm and a forwardly extending arm and being mounted on said carriage for rotation relative thereto about a substantially horizontal axis, said rearwardly extending arm comprising handle means for moving said carriage over said surface and for rotating said frame, an adjustable converging squeegee for wiping said surface mounted on said forwardly extending arm for rotation therewith and having two pivoted arms arranged to converge at their rear ends, the positions of said squeegee arms being independently adjustable with respect to each other to vary the angularity between them, means for securing said squeegee arms in a selected angular relationship, and a vacuum nozzle positioned adjacent the apex of said squeegee and adapted to be connected to the suction inlet of said cleaner when the cleaner is mounted on the carriage.

8. An apparatus for drying a wet surface which comprises the combination of a vacuum cleaner having a suction port and an air discharge port and being removably mounted on a carriage, a converging squeegee for wiping said surface mounted on said carriage, a vacuum nozzle connected to said suction port and positioned adjacent the apex of said squeegee, an air discharge nozzle connected to said discharge port and arranged to discharge air on the surface behind said squeegee, and handle means pivotally mounted on said carriage and coupled with said squeegee for moving said carriage over said surface and for raising and lowering said squeegee independently of said carriage on pivotal movement of the handle means.

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