Sept. 20, 1966 A. SODERHOLM ETAL 3,273,193

CLEANING APPARATUS

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Fig. 2

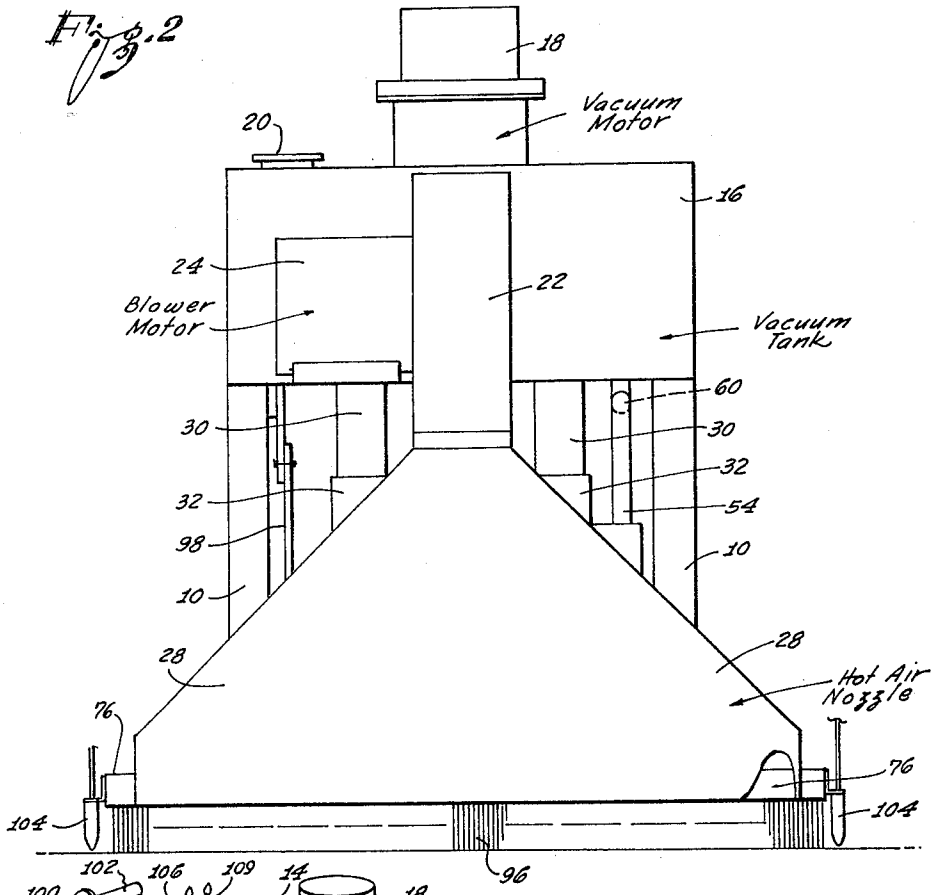
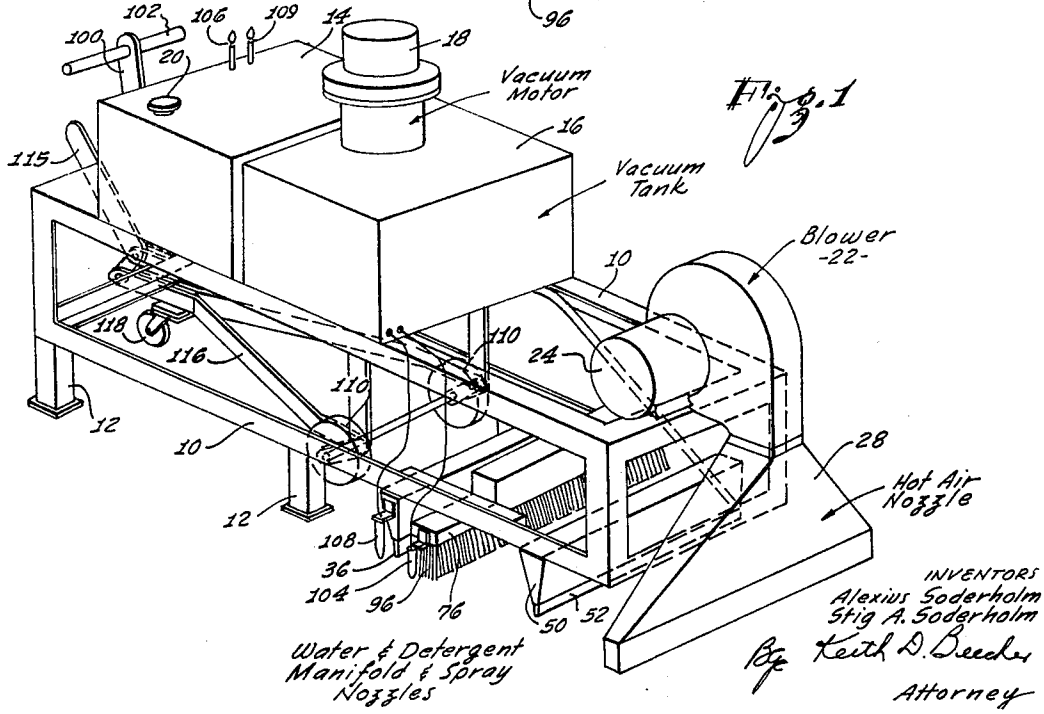


Fig. 1



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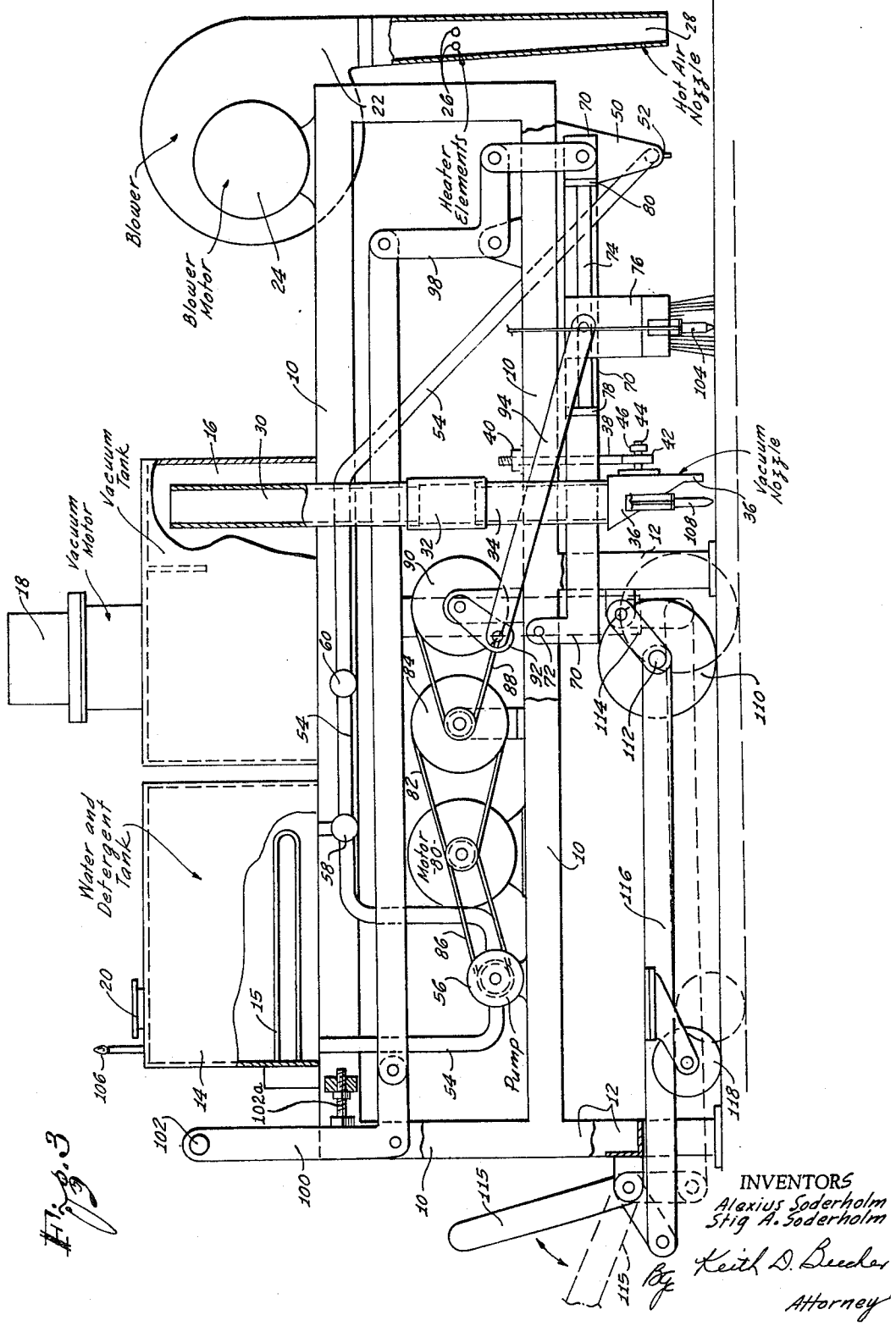


Fig. 3

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CLEANING APPARATUS

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Fig. 4

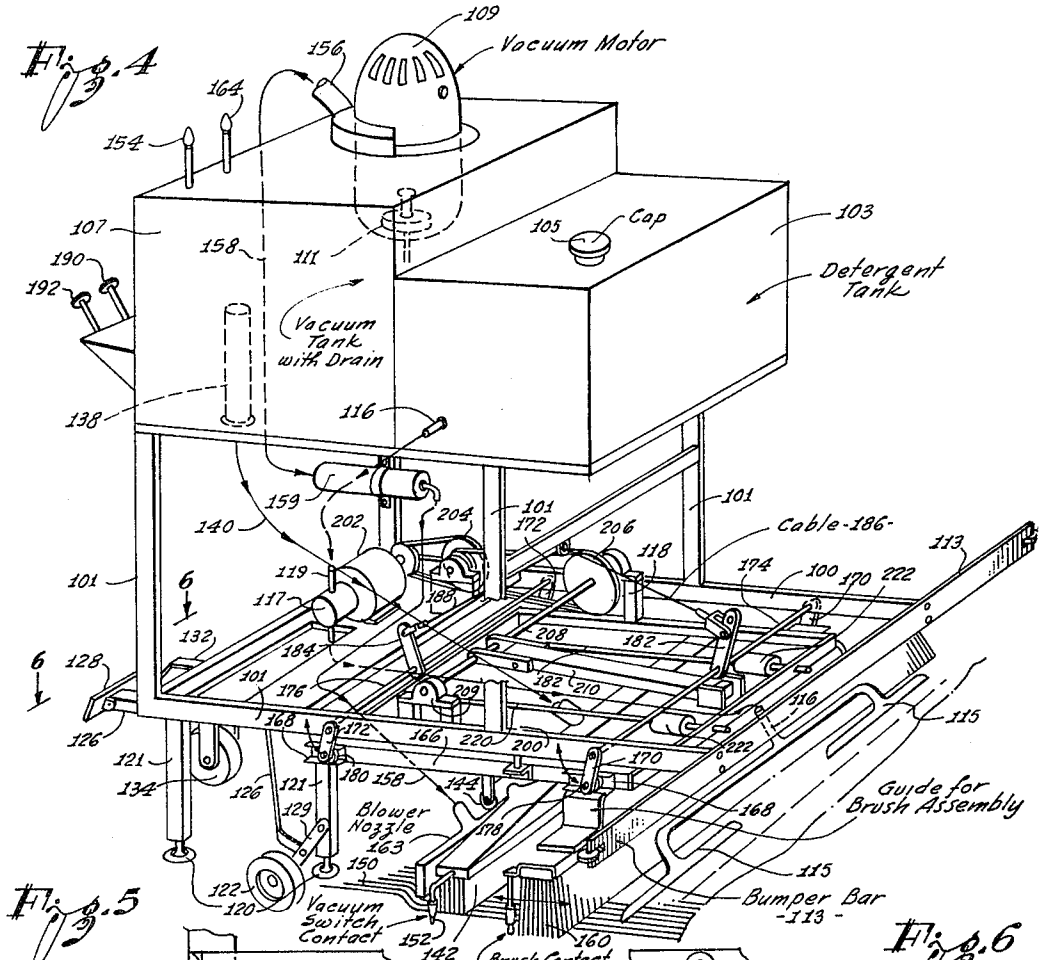


Fig. 5

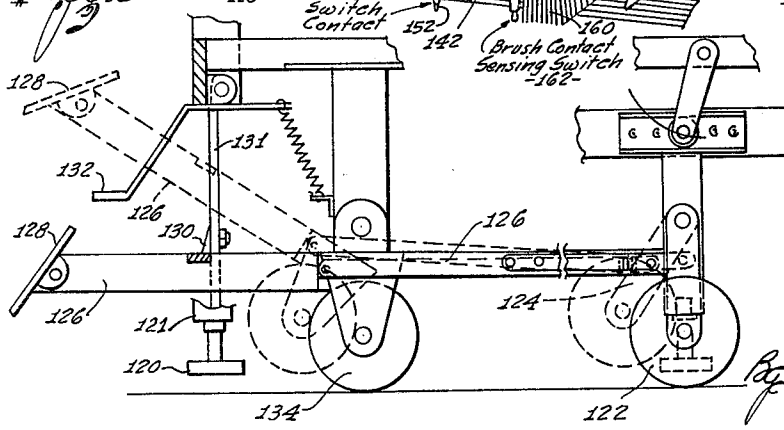
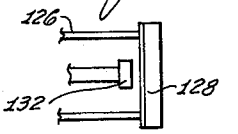


Fig. 6



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3,273,193

CLEANING APPARATUS

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Filed Mar. 22, 1965, Ser. No. 444,920
13 Claims. (Cl. 15—320)

This application is a continuation-in-part of our co-pending application Serial No. 332,574 and entitled, Cleaning Apparatus, filed December 23, 1963, and features disclosed and claimed herein are disclosed in our application Serial No. 225,444 of the same title, now abandoned, which was filed September 24, 1962, and was copending with the first mentioned application.

The present invention relates to cleaning apparatus and it relates more particularly to an improved machine which is constructed to have particular utility in the cleaning of the traveling steps of escalators.

It is usual, in accordance with present day building maintenance practices, to clean escalators by hand. This manual operation, however, is arduous and time-consuming. For example, it has been found that approximately six hours are required in order to clean a usual escalator by hand.

Because of the peculiar shape and movement of the escalator, however, and the serrated configuration of the usual escalator steps, the provision of suitable apparatus for mechanically cleaning escalators has not been forthcoming in the prior art.

An object of the present invention is to provide an improved apparatus which is capable of thoroughly cleaning escalators, and of accomplishing this in a simple and straightforward manner and in a minimum of time.

A further object of the invention is to provide such improved cleaning apparatus which is easy to move around and easy to operate.

A still further object of the invention is to provide such improved cleaning apparatus which is relatively simple in its construction, and which uses relatively inexpensive and readily available component parts.

The improved apparatus of the present invention has a cantilever section and is constructed so that it may be wheeled onto a sill or stationary sill platform at the upper end or lower end of an escalator with cleaning components on the cantilever section positioned to operate on the upper or lower movable platform that is formed by the steps of the escalator as the steps approach the top or bottom of the escalator. When the apparatus is in position, it is firmly supported on an adjustable support. Then, as the escalator moves under the cantilever section of the apparatus, a vacuuming, cleansing, brushing, and drying action takes place, as will be described.

As mentioned above, the entire operation by means of the cleaning machine of the invention may be performed in a fraction of the time required for manually cleaning an escalator. Moreover, far superior results may be achieved by the apparatus of the invention, as compared with the usual hand-cleaning processes.

Other objects and advantages of the invention will be apparent from a consideration of the following description in conjunction with the accompanying drawings, in which:

FIGURE 1 is a perspective view of cleaning apparatus constructed in accordance with one embodiment of the invention;

FIGURE 2 is a front elevation view of the apparatus of FIGURE 1;

FIGURE 3 is a side elevational view, partly in section, of the apparatus of FIGURE 1;

FIGURE 4 is a perspective view of a second embodiment of the invention;

FIGURE 5 is a fragmentary side elevational view, partly in section, of the apparatus of FIGURE 5; and

FIGURE 6 is a fragmentary plan view of parts of the apparatus of FIGURE 4, taken substantially on the line 6—6 of FIGURE 4.

The embodiment of the invention illustrated in FIGURES 1–3 has a body structure or frame **10** which may be formed of steel, or other suitable material and which includes a plurality of downwardly extending posts **12**. These posts serve to support the apparatus rigidly and firmly, when it is in place performing its cleaning function. The previously mentioned cantilever section is the forward portion of the body structure **10** which extends forward or to the right in FIGURE 3 from the four posts **12**. The portion of the frame **10** above the four posts **12** may be termed the main section or the carriage of the apparatus.

A pair of tanks **14** and **16** are mounted on the upper portion of the frame **10**. The tank **16** functions as a vacuum tank, and a vacuum motor **18** is supported on its upper surface. The tank **14**, on the other hand, serves as a housing for water and detergent. This latter tank includes a filler cap **20**. An electrically energized heater element **15** is included in the tank **14**.

A blower **22** is also mounted on the frame **10** at the forward end thereof. The blower includes a blower motor **24** mounted on the upper surface of the frame, adjacent the forward edge. The blower **22** also includes internal electrically energized heater elements **26** (FIGURE 3), and these elements heat the air from the blower, so that a blast of hot air issues from the lower edge of a hot air nozzle **28** which is mounted on the blower. The lower edge of the hot air nozzle **28** extends transversely across the apparatus at the forward edge of the apparatus.

A pair of inlet pipe lines **30** extend into the vacuum tank **16** as stand pipes therein, and these lines are coupled by rubber hoses **32** to corresponding vacuum lines **34**. The vacuum lines **34** are supported in the frame **10**, and they are coupled to a vacuum nozzle **36**. The vacuum nozzle **36** also extends transversely across the apparatus, and it is positioned on the frame **10** at a point displaced back from the hot air nozzle **28**, as best shown in FIGURES 1 and 3.

The vacuum nozzle **36** is suspended from the frame **10** by a pair of adjustable hanger rods **38** which extend down from the frame **10** and are supported on the frame **10** by nuts **40**. Also, each of the hanger rods **38** has a threaded lower end which extends into a support bracket **42** on the vacuum nozzle **36**.

Horizontal studs **44** extend from the brackets **42** into the body of the vacuum nozzle **36** and are provided with nuts **46**. The height of the vacuum nozzle **36** can be adjusted to any desired elevation by the nuts **40**.

A manifold **50** is mounted on the under side of the frame **10** adjacent the forward edge thereof, and this manifold extends downwardly from the frame **10**. A plurality of spray nozzles **52** are mounted along the lower edge of the manifold **50**. A fluid line **54** couples the manifold **50** to the water and detergent tank **14**. A pump **56** is disposed in the line **54**, so that the detergent and water may be forced out of the nozzles **52** at high pressure. A pressure relief valve **58** is included in the line **54**, as is a shut-off valve **60**.

A pair of forwardly extending arms **70** are pivotally mounted on the opposite sides respectively of the frame **10** by pivot means **72**, the two arms being below the level of the frame **10**. Each of the pivoted arms **70** includes a guide bar **74** and a brush **76** is mounted on the guide bars with freedom to slide thereon between a pair of stops **78** and **80**. The brush **76** extends transversely across the frame **10** under the lower surface thereof and has stiff bristles **96** which extend down into the

serrations or grooves between the longitudinal ridges or treads of the escalator during the operation of the apparatus, as will be described.

The pump **56** is driven by an electric motor **80**, and this motor is coupled by a belt **82** to a speed reducing pulley assembly **84**. The motor is also coupled by a belt **86** to the pump **56**. A further belt **88** couples the pulley assembly **84** to a pulley **90**. The pulley **90** drives a crank arm **92**, and this arm is coupled by a connecting rod **94** (FIGURE 3) to one side of the brush **76**. A similar crank arm **92** and connecting rod **94** is driven by the pulley **90** and are coupled to the opposite side of the brush **76**.

When the motor **80** is energized, the heated detergent solution from the tank **14** is pumped by the pump **56** through the line **54** to issue as a spray from the nozzles **52**. Also, the rotation of the pulley **90** causes the brush **76** to move back and forth along the guide bars **74** with a reciprocating motion.

The height of the brush **76**, and of its bristles **96**, with respect to the surface to be cleaned, can be adjusted by means of a linkage **98**. The linkage **98** couples the free end of one of the bracket arms **70** to a crank arm **100**. The crank arm **100** is pivotally mounted on the rear end of the frame **10**, and it includes a handle **102**. During the operation of the apparatus, the crank arm **100** may be manipulated angularly in one direction or the other by its handle **102**, so that the reciprocating brush **76** is adjusted to the proper height properly to perform its scrubbing function. Any desired adjustment may be maintained by adjustable stop screw means **102***a* positioned to cooperate with the crank arm.

A pair of spring biased sensing switches, such as the switch **104**, are mounted adjacent the ends of the reciprocating brush **76**. These switches include downwardly extending spring biased plungers, and the switches are caused to close when the brush **76** is lowered to the proper position for performing its cleaning operation and the aforesaid plungers are moved inwardly thereby against this spring biasing pressure. When the brush **76** is in its proper condition such that both the switches **104** are closed, an indicator lamp, such as the indicator **106**, is energized.

It is apparent that the described mechanism for adjusting the brush **76** relative to the level of the traveling steps together with the sensing and indicating means constitute means to insure correct positioning of the brush relative to the surfaces of the traveling steps.

A similar pair of sensing switches **108** are mounted adjacent the vacuum nozzle **36**. These latter switches, for example, cause an indicator lamp **109** (FIGURE 1) to be energized when the vacuum nozzle is in its proper position to perform its required function.

In order that the apparatus may be mobile, rolling means including a pair of forward wheels **110** are provided. These wheels are mounted on a shaft **112**, which in turn is supported by a pair of links **114**. The links **114** are pivotally mounted on respective protruding portions of two of the posts **12**. The lower ends of the links **114** are coupled to a wheel retracting arm **115** by means of a yoke **116**. The retracting arm **115** is the form of a pivoted crank arm, and it can be moved from an upper to a lower position by, for example, the foot of the operator.

When the arm **115** is moved to its lower position (counterclockwise in FIGURE 3), the yoke **116** moves the forward wheels **110** to their down position, and the wheels are held in their down position by the resulting off-center angular orientation of the links **114**.

A caster **118** is pivotally mounted to the rear end of the yoke **116**, so that it too comes into an operative position when the arm **115** is moved to the down position. The caster **118** is shown connected somewhat differently in the view of FIGURE 1 as compared with the view of FIGURE 3. For example, the caster **118** is shown

as connected to the underside of the yoke **116** in FIGURE 1, and to the upper side of the yoke in FIGURE 3.

Therefore, the apparatus of FIGURES 1–3 is readily mobile. When it is desired to move the apparatus from one point to another, the retracting arm **115** is moved downwardly, so that the wheels **110** and the caster **118** are, likewise, moved downwardly and locked, due to the off-center position of the links **114**. It is important to note that the heavy components of the apparatus including the two tanks and the vacuum motor are carried by the main section to overbalance the cantilever section.

The fixed posts **12** on the underside of the body structure may be termed collectively a first fixed support means and the wheels **110** together with the caster **118** may be termed a second support means that is retractable from a downwardly extending position to immobilize the apparatus. It is to be noted that the body structure rises when the second support means is extended downward and the body structure descends when the second support means is retracted and that the scrubbing means comprising the brush **76** rises and descends with the body structure. Thus the level of the scrubbing means is lowered relative to the floor level in response to retraction of the second support means. This fact lessens the vertical range relative to the body structure through which the scrubbing means must be moved downward to make scrubbing contact with the escalator steps when the apparatus is immobilized and through which the scrubbing means must move upward for adequate spacing above floor level when the apparatus is moved from one operating location to another.

It is also to be noted that when the set screw **102***a* is adjusted as shown in FIG. 3 so that the crank arm **100** holds the brush **76** at the correct level to contact the surfaces of the approaching steps, the brush **76** is lowered to an effective level in response to upward retraction of the wheels **110** together with the caster **118** and is automatically elevated from its effective level in response to downward extension of the wheels and caster in preparation for moving the apparatus to a new location. In other words, the adjustment shown in FIG. 3 makes it unnecessary to raise and lower the brush **76** relative to the body structure each time the apparatus is moved from a cleaning operation at one location to a cleaning operation at another location.

The apparatus may be rolled onto the top or lower sill or stationary platform of an escalator with the cantilever structure forward of the front wheels **110** extending over the adjacent moving steps of the escalator and with the steps moving toward the apparatus. The arm **115** is then moved upwardly, so that the apparatus comes to rest firmly supported by the posts **12** on the stationary sill. At this latter position, the vacuum nozzle **36** is adjusted if necessary to be at the proper height; as indicated by the actuation of the sensing switches **108**, and the glowing of the corresponding lamp **109**. The arm **100** is then manipulated, so that the brush **76** is brought down to its proper height. The adjustment of the brush **76** is indicated by the glowing, for example, of the lamp **106**, under the control of the sensing switches **104**.

The escalator is assumed to be moving from the right to the left in FIGURE 3, and directly under the vacuum nozzle **36**, the brush **76**, the nozzle **52**, and the hot air nozzle **28**.

The vacuum motor **28** is energized, so that the vacuum nozzle **36** may withdraw dirt, water and other extraneous matter from the escalator surface. At the same time, the motor **80** is energized, so that the brush **76** is moved vigorously back and forth, to scrub out the serrations or grooves of the escalator surface. The motor **80** also drives the pump **56**, so that the detergent solution is sprayed from the nozzles **52**. The hot air from the nozzle **28** is blown across the portion of the escalator surface being cleaned so that the surface will be dry as it issues from the rear of the apparatus.

It is to be noted that the transverse row of spray nozzles **52** is at substantial spacing forward from the brush **76** to settle the dust in advance of the contact of the brush with the traveling surfaces and to provide a time interval in which the cleaning solution may soak the traveling surfaces to loosen foreign material thereon before the brush acts on the foreign material. It is to be further noted that the reciprocation of the brush relative to the traveling surfaces results in cycles of operation comprising forward brush strokes at a higher speed relative to the surface of the traveling steps than the speed of travel of the traveling steps relative to the body structure for effective mechanical action to loosen the soaking foreign material and alternate brush strokes of substantially less speed relative to the speed of travel of the steps to intermittently increase the spacing of the brush means from the spray means for intermittent increase in the soaking period and to permit surplus cleaning fluid and foreign material loosened by the brush means to travel under the brush means. It is to be further noted that the vacuum means comprising the vacuum nozzle **36** is positioned on the body structure to entrain the surplus cleaning liquid and the particles that are loosened by the brush action against the soaking foreign material.

At the termination of the cleaning operation, the various motors **18**, **24** and **80** are de-energized, and the wheel retracting arm **115** is pushed down to its lower position, so that the apparatus may be elevated up on the wheels **110**, and on the caster **18**. The apparatus may then be moved away from the escalator.

The second embodiment of the invention shown in FIGURES 4, 5 and 6 is generally similar to the first embodiment described above.

The second embodiment includes a frame **101**. A tank **103** is mounted on the upper portion of the frame **101**, and this tank is intended to contain a detergent solution. The tank **103** is provided with a filler cap **105**. A vacuum tank **107** is also supported on the frame **101** adjacent the tank **103**. A vacuum pump actuated by a motor **109** is supported on the vacuum tank **107**.

A bumper bar **113** is mounted on the forward end of the frame **101**, and a plurality of detergent spray nozzles **115** are mounted on the bumper **113**. A pump **117** is mounted on the frame **101**, and a pipe line **119** extends from the detergent tank **103** to the pump, and from the pump to the detergent spray nozzles **115**.

The frame **101** includes a group of downwardly extending posts **121**. The posts **121** extend down from the lower portion of the frame **101**, and they serve as a firm and rigid support for the assembly. A corresponding plurality of pedestals **120** are threaded into the lower ends of the posts **121**, and these pedestals may be adjusted, so that the frame **101** may be supported by the posts firmly and rigidly, and at a predetermined height.

A pair of forward wheels, such as the wheel **122** are pivotally mounted on a corresponding pair of posts **121** by respective arms, such as the arm **124**. These arms are pivotally coupled to a yoke **126**. The yoke **126** is actuated by a foot pedal **128**, and it is latched in its lower position by an appropriate latch **130**. The latch **130** is mounted on a pivotally mounted spring loaded arm **131**. The latch may be released by a second foot pedal **132**. (See FIGURES 5–6.)

A caster **134** is pivotally mounted on the yoke **126**. When the yoke is moved to its lower position, the wheels **122** and the caster **134** hoist the apparatus up off the pedestal **120**, so that it may be moved about.

Here again the portion of the frame **101** above the group of posts **121** and above the wheels **122** and the caster **134** may be termed the main section or carriage of the apparatus and the portion of the frame that extends forward therefrom or to the right in FIGURE 4 may be termed the cantilever section.

A vacuum stand pipe **138** extends into the vacuum tank **107**, and this pipe is coupled by a vacuum pick up line **140** to a vacuum brush **142**. The vacuum brush **142** extends transversely across the apparatus, and it is supported from a vacuum manifold **144**. The line **140** extends into the manifold, and the manifold is coupled to the brush **142**.

The vacuum established in the tank **107** by the motor **109** causes a suction to be established across the brush **142**, to pick up the dirt and water from the escalator as the dirt is placed in motion by the relative movement of the vacuum brush **142** as the escalator surface moves past the vacuum brush. The escalator surface is designated **150** in FIGURE 4 and it is assumed to be moving from the right to the left.

A pair of sensing switches **152** are provided at the ends of the vacuum brush **142**, and these switches are actuated when the brush **142** is at the proper level with respect to the escalator, so as to energize an indicator lamp **154** at the top of the assembly.

The exhaust pipe **156** from the vacuum motor **109** is coupled by a line **158** through a heater **159** to a blower nozzle **163**. The heater **159** may be electrically energized. It may, for example, be a 160-watt, fin type aluminum heater, of the type presently made and sold by the Frost Industrial Electric Company, of Los Angeles, California.

A cleaning brush **160** is supported on the frame **101**, and this brush extends transversely across the frame between the vacuum brush **142** and the detergent spray nozzle **115**. A pair of sensing switches **162** are mounted on opposite ends of the brush **160**, and these switches are actuated when the brush **160** is in its proper position. The actuation of the switches **162** causes an indicator lamp **164** to be energized.

The transverse cleaning brush **160** is supported on a longitudinal frame **166** which, in turn, is suspended under the frame **101**. The longitudinal frame **166** has a pair of guide brackets **168** mounted on each side. A first and second pair of arms **170**, **172** are mounted on the ends of respective shafts **174** and **176**. The shafts **174** and **176** are mounted in and extend across the apparatus frame **101**. Rollers **178** and **180** are mounted at the lower end of the respective arms **170** and **172**, and these rollers engage the guides **168** on the carriage frame **166**.

A pair of crank arms **182** and **184** are affixed to the respective shafts **174** and **176**, and these crank arms extend radially out from the respective shafts. Cables **186** and **188** capable of exerting thrust as well as pull couple the crank arms **182** and **184** to respective controls **190** and **192**. The controls **190** and **192** are the usual type such as made and sold by the American Chain and Cable Company, of Detroit, Michigan, and which may be drawn out to any desired extension and then turned to lock at that extension.

The controls **190** and **192** serve to adjust the angular positions of the arms **170** and **172** which, in turn, serve to control the elevation of the longitudinal frame **166** and the brush **160**, with respect to the apparatus frame **101**. A pair of guide posts, such as the posts **200**, are affixed to the carriage frame **166**, and these guide posts extend upward through apertures (not shown) in the frame **101** for vertical guidance of the frame **166**.

The pump **117** is driven by a motor **202**, and this motor is also coupled to a speed reduction pulley assembly **204**. The pulley assembly **204**, in turn, is coupled to a pulley **206** which drives an eccentric shaft **208** which functions in the manner of a crank. The opposite ends of the shaft **208** are mounted eccentrically in bearings **209**. A connecting rod **210** couples the shaft **208** to the brush **160**. A pair of guide rods **220** are fixed to the underside of the longitudinal frame **166** to support the brush **160**, and these guide rods extend through bushings **222** on the brush. The brush **160**, therefore, is reciprocated back and forth on the supporting guide rods **220** by the connecting rods **210**.

In the embodiment of FIGURES 4–6, the foot pedal **128** may be pushed down to the position shown in FIG-

URE 5 to move the wheels **122** and caster **134** into supporting positions. The apparatus may then be rolled onto the upper or lower sill or stationary platform of the escalator to place the cantilever section of the apparatus in operating position over the steps that are moving towards the apparatus.

When the apparatus is properly positioned, the wheel retracting yoke **126** is released by actuation of release pedal **132**, to cause the apparatus to be set down on the adjustable pedestals **120** of the posts **121**. These pedestals are adjusted so that the apparatus will be supported on the posts at a desired height. This height is such that the vacuum brush **142** is in its proper position, as indicated by glowing of the indicator lamp **154**.

The sensing switches **152** are mounted at the two ends respectively of the vacuum brush **142**, so that if the vacuum brush is improperly tilted, only one of the switches will be actuated. These switches are connected in series in the circuit of the lamp **154**, so that both switches must be actuated before the lamp will glow. This applies also to the other sensing switches described above.

When the apparatus is in position, the motor **109** and the motor **202** are energized. The energization of the motor **109** causes the vacuum brush **142** to suck dirt, water and other matter up into the vacuum tank **107**. The exhaust from the vacuum pump that is driven by the motor **109** causes air to be blown through the heater **159**. This air is heated by the heater **159**, so that hot air is blown from the blower nozzle **163**.

The energization of the motor **202** causes the pump **117** to produce a detergent spray at the nozzle **115**. Also, the motor **202** drives the brush **160** so that the brush is reciprocated on the guide rods **220** in a scrubbing action. The brush **160** may be adjusted to the proper height, as mentioned above, by the manipulation of the controls **190** and **192**. It is contemplated that the bristles of the forward brush **160** will be adjusted to brush dirt from the upper surfaces of the longitudinal treads of the steps into the grooves between the treads and that the bristles of the vacuum brush **142** will extend to the bottom of the grooves to facilitate entrainment of the dirt in the bottoms of the grooves by the vacuum nozzle or manifold **144**. The indicator lamp **164** indicates when the sensing contact switches **162** are actuated to show that the brush **160** is in its proper position.

When the mechanism of FIGURES 4, 5 and 6 is activated, the detergent spray issues from the nozzles **115** and the reciprocating brush **160** scrubs the moving surfaces of the escalator with the detergent solution. The vacuum brush **142** then draws water and dirt up into the vacuum tank **107**. The water and dirt collect in the bottom portion of the tank **107**, and an appropriate drain is provided for the tank.

The vacuum brush **142** may be provided with a squeegee in front which rides on top of the treads or longitudinal ribs of the escalator. This squeegee forces all moisture and water down into the channels or grooves between the treads. The vacuum brush **142** may have a dense mass of bristles to assure that all foreign matter is picked up by the vacuum suction and nothing gets past the vacuum brush.

The intake to the vacuum pump that is driven by the motor **109** may be provided with a float switch **111** which assures that the motor will be shut off if water in the vacuum tank rises above a safe level. This motor may be of the general type manufactured by the National Super Service Company, of Toledo, Ohio.

An important feature of the apparatus described above, in both embodiments, is the fact that when the apparatus is in a cleaning position, it is caused to be set firmly and securely on its upright posts. For this purpose heavy components are carried by the main section to overbalance the cantilever section and the components thereon. This is most important, in that these posts serve to support the apparatus firmly and securely, with the brushes and other components at the proper height, as the belt of the escalator is drawn between the posts and past the cleaning components of the apparatus.

The sensing switches on the various components of the apparatus are important, in that when the apparatus is in place, it is difficult to observe the position of the actual brushes. These sensing switches, together with the associated indicator lamps, provide convenient and positive indication when the components are properly adjusted.

The rate of flow of the detergent can be regulated, so that the correct amount of moisture is provided. Then, after the scrubbing action by the brush **160**, and the subsequent cleaning action by the vacuum brush **142**, the blower nozzle **163** assures that the escalator will be cleaned and dry. It is most important, of course, that all moisture be removed from the escalator after the cleaning operation.

Preferably the brush **76** of the first embodiment and the brush **160** of the second embodiment are reciprocated continuously throughout the whole of a cleaning operation. If desired, however, the brush may be reciprocated only at the start of the cleaning operation to cause the bristles of the brush to extend into the grooves between the treads and then actuation of the brush may be terminated because thereafter the travel of the escalator will provide sufficient relative movement between the brush and the surface of the escalator to make the brush effective.

It is evident, that although certain embodiments of the invention have been described above, further modifications may be made. The following claims are intended to cover all modifications which fall within the scope of the invention.

We claim:

1. A mechanism for cleaning an escalator, and the like, including:

a carriage having a rectangular configuration;

a plurality of support posts extending downwardly from said carriage;

a retractable wheel assembly mounted on said carriage, said wheel assembly including a plurality of wheels, pivotal means coupling said wheels to said carriage, and means for actuating said pivotal means to set said carriage down on said support posts;

an elongated brush member;

adjustable means for mounting said elongated brush member on said carriage in position extending transversely to the longitudinal axis thereof, whereby the elevation of said brush member with respect to said carriage may be controlled;

an elongated vacuum nozzle member mounted on said carriage and extending transversely to the longitudinal axis thereof adjacent said brush member and in spaced relationship therewith;

a vacuum tank mounted on said carriage;

vacuum motor means coupled to said vacuum tank;

feedline means coupled to said vacuum tank and to said vacuum nozzle for introducing a vacuum pressure to said vacuum nozzle;

a cleansing fluid tank means mounted on said carriage;

spray nozzle means mounted on said carriage in the vicinity of said brush member; and

means including a pump coupling said cleansing fluid tank means to said spray nozzle means for enabling said nozzle means to discharge cleansing fluid in the vicinity of said brush member.

2. The mechanism defined in claim **1**, and which includes hot air blower means mounted on said carriage for producing a hot air stream in the vicinity of said brush member.

3. The mechanism defined in claim **1**, and which includes electrically energized indicator means, and sensing switch means mounted on said brush means for controlling the energization of said indicator means when said

brush member is in a predetermined position with respect to the escalator.

4. The mechanism defined in claim 1, in which said elongated brush member is mounted on said carriage for reciprocal movement along the longitudinal axis thereof; and

which includes a drive motor mounted on said carriage; and

means coupling said drive motor to said brush member for imparting reciprocal movement to said brush member along the longitudinal axis of said carriage.

5. A mechanism for cleaning an escalator, and the like, including:

a carriage;

a supporting means extending downwardly from said carriage;

a retractable wheel assembly mounted on said carriage, said wheel assembly including a plurality of wheels, pivotal means coupling said wheels to said carriage, and means for actuating said pivotal means to set said carriage down on said support means;

a brush member;

adjustable means for mounting said brush member on said carriage in position to extend downwardly therefrom, whereby the elevation of said brush member with respect to said carriage may be controlled;

a vacuum nozzle member mounted on said carriage and extending downwardly therefrom adjacent said brush member and in spaced relationship therewith;

a vacuum tank mounted on said carriage;

vacuum motor means coupled to said vacuum tank;

feedline means coupled to said vacuum tank and to said vacuum nozzle for introducing a vacuum pressure to said vacuum nozzle;

a cleansing fluid tank mounted on said carriage;

spray nozzle means mounted on said carriage and extending downwardly therefrom in the vicinity of said brush member; and

means including a pump coupling said cleansing fluid tank means to said spray nozzle means for enabling said nozzle means to discharge cleansing fluid in the vicinity of said brush member.

6. In an apparatus of the character described for cleaning the moving steps of an escalator as the steps travel relative to a sill platform at one end of the escalator, the combination of:

a body structure for positioning on the sill platform with a forward portion of the body structure overhanging the approaching steps;

wheel means mounted on the body structure to make the body structure mobile for transportation from one escalator to another;

means operable in one respect to immobilize the body structure on a sill platform for a cleaning operation in substantially a horizontal position, and operable in an opposite respect to free the body structure for transportation while retaining the horizontal position of the body;

scrubbing means for scrubbing the surfaces of the approaching steps; and

means for mounting said scrubbing means to the forward portion of the body structure, to render the scrubbing means responsive to immobilization and freeing of the body structure for positioning said scrubbing means in a first, relatively low level in relation to the approaching steps and in response to immobilization of the body structure, and in a second, higher level above the surface of the approaching steps in response to freeing of the body structure for transportation.

7. A combination as set forth in claim 6 which includes blower means on the body structure to discharge air onto the traveling steps.

8. A combination as set forth in claim 7 which includes means to heat the air discharged by the blower means.

9. In an apparatus of the character described for cleaning the moving steps of an escalator as the steps travel relative to a sill platform at one end of the escalator, the combination of:

a body structure for positioning on the sill platform with a forward portion of the body structure overhanging the approaching steps;

wheel means mounted on the body structure to make the body structure mobile for transportation from one escalator to another;

means operable in one respect to immobilize the body structure on a sill platform for a cleaning operation in substantially a horizontal position, and operable in an opposite respect to free the body structure for transportation while retaining the horizontal position of the body;

brush means carried by the forward portion of the body structure;

said brush means including a first set of bristles positioned to brush foreign material from the upper surfaces of the longitudinal treads of the traveling steps into the grooves between the treads;

said brush means including a second set of bristles spaced from the first set in the direction of travel of the steps, said second set of bristles extending into the bottoms of the grooves between the treads to loosen adhering foreign material therein and act upon material displaced into the grooves by the first set of bristles;

vacuum means including a vacuum nozzle carried by the body structure to entrain foreign material from the traveling steps, said vacuum means being spaced from said first set of bristles of said brush means in the direction of travel of the steps for entrainment of the foreign material as loosened by said brush means; and

means for mounting said brush means to the forward portion of the body structure, and being responsive to immobilization and freeing of the body structure for positioning said brush means in a first, relatively low level in relation to the approaching steps and in response to immobilization of the body structure, and in a second, higher level above the surface of the approaching steps in response to freeing of the body structure for transportation.

10. In an apparatus of the character described for cleaning the moving steps of an escalator as the steps travel relative to a sill platform at one end of the escalator, the combination of:

a body structure for positioning on the sill platform with a forward portion of the body structure overhanging the traveling steps;

first fixed support means on the underside of the body structure;

second support means in the form of wheel means on the body structure,

said second support means being retractable from a lower extended position at which it support the weight of the body structure for wheeled movement thereof to an upper retracted position to switch the weight of the body structure to the first support means to immobilize the body structure,

with consequent lowering of the body structure from an upper level for transportation to a lower level for a cleaning operation; and

scrubbing means carried by said forward portion of the body structure to scrub the surfaces of the traveling steps,

said scrubbing means being responsive to the extension and retraction of the second support means to descend towards the level of the traveling steps when the second support means is retracted to immobilize the body structure and to rise above the level of the

traveling steps when the second support means is extended for transportation of the body structure.

11. A combination as set forth in claim **10** in which said second support means comprises forward and rearward wheel means for extension and retraction to raise and lower the body structure as a whole.

12. A combination as set forth in claim **10** in which said scrubbing means includes a reciprocating brush means together with means to apply a cleaning fluid to the surfaces of the traveling steps.

13. A combination as set forth in claim **12** in which the means to apply the cleaning fluid sprays the cleaning fluid onto the surfaces of the traveling steps, the spraying means being positioned to soak foreign material on the steps before the brush means makes contact with the foreign material.

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