

Oct. 21, 1969

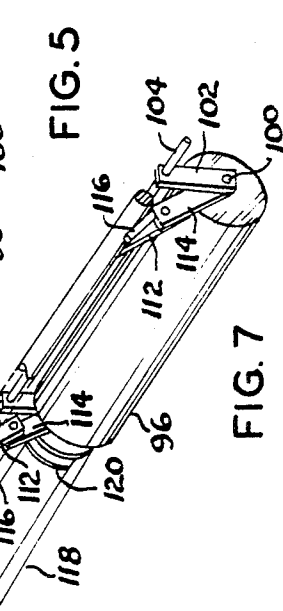
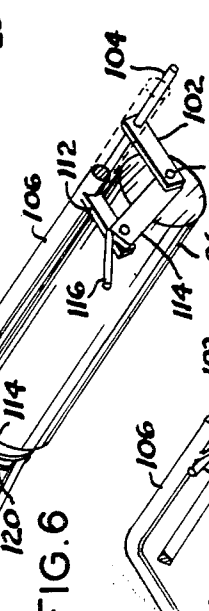
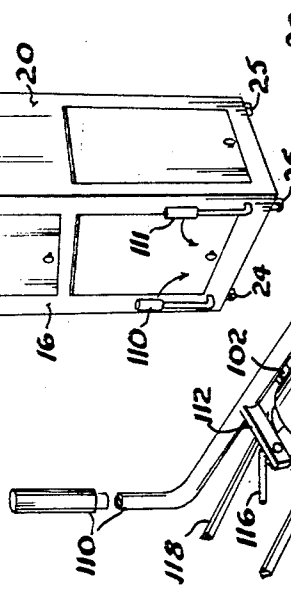
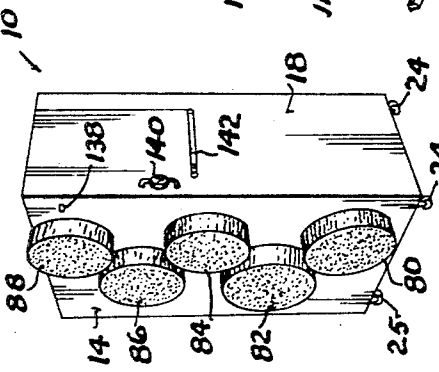
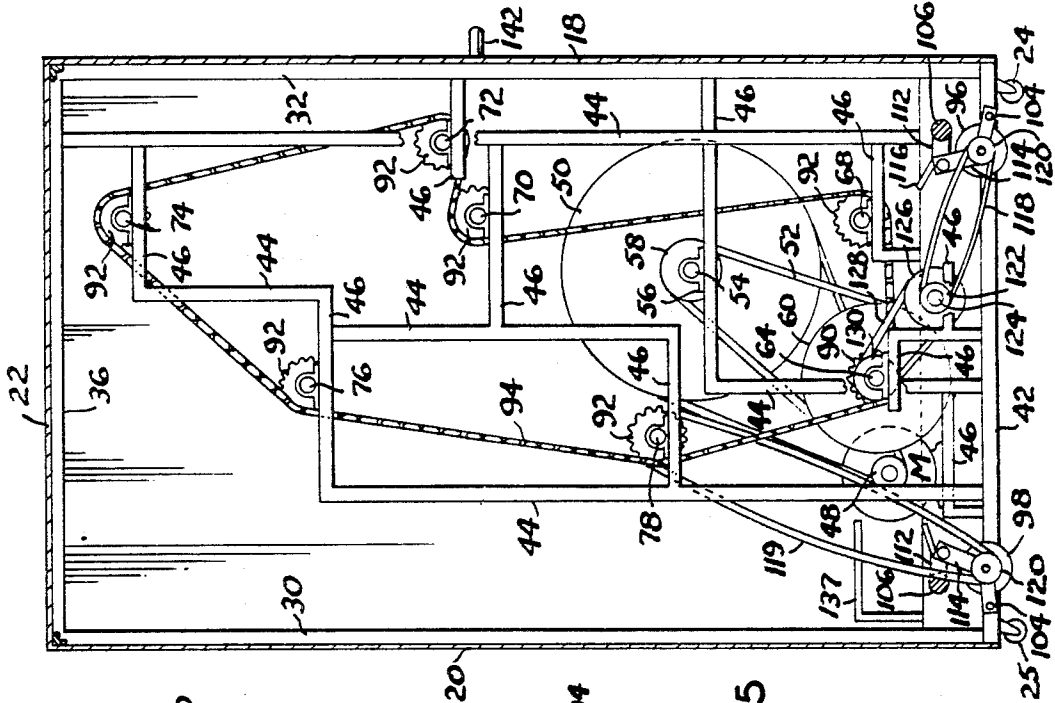
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3,473,180

WALL SCRUBBING AND BUFFING MACHINE

Filed Feb. 14, 1968

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

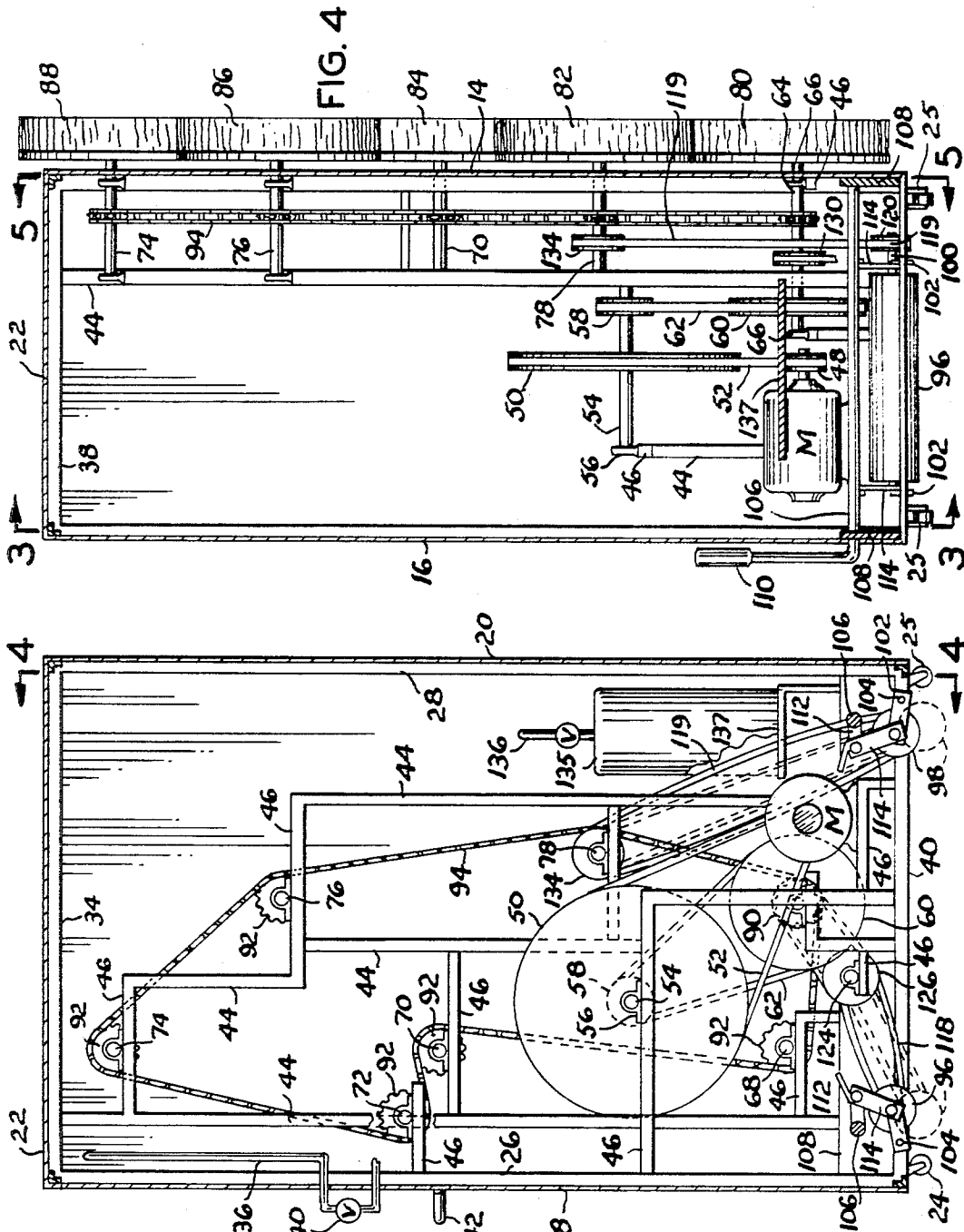


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3,473,180

## WALL SCRUBBING AND BUFFING MACHINE

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Filed Feb. 14, 1968, Ser. No. 705,492  
Int. Cl. A47I 11/38

U.S. Cl. 15—50

5 Claims

### ABSTRACT OF THE DISCLOSURE

An upright frame horizontally journals a plurality of sprocket equipped stub shafts having a chain entrained therearound driven by a motor through belt and pulley means. A like plurality of scrubbing brushes are connected to one end of the stub shafts. Rollers, journaled by pivoting linkage, at the respective ends of the frame base, are driven by the motor through other belt and pulley means when the respective roller is pivoted downwardly of the frame base for moving the machine in a forward or reverse direction.

### BACKGROUND OF THE INVENTION

The present invention relates to power driven scrubbing machines and more particularly to a wall scrubbing and buffing machine for commercial buildings.

The walls of hallways and rooms of school buildings, particularly elementary schools, are difficult to maintain in a clean and sanitary condition. In an effort to maintain such walls clean and render their appearance more attractive recently constructed elementary school buildings have the walls thereof finished from the floor upwardly to a height of approximately five or six feet, with ceramic tile. This has eliminated, to a great extent, damage to plaster or plaster-board walls and the periodic repainting thereof but it has not eliminated the necessity of frequent cleaning of the walls to remove hand stain, chalk, crayon markings, etc. These tile walls may be easily cleaned but scrubbing such walls in an entire school building is a laborious and time consuming task.

Wall scrubbing machines are disclosed by the patent to Pino No. 1,660,207 and Whitsitt No. 1,823,222 but neither of these machines are provided with means for progressive power driven movement, in opposing directions, along a wall to be scrubbed. The patent to Bradley No. 2,809,763 discloses a vertically disposed baseboard scrubbing brush mechanism which is manually moved along the baseboard.

This invention provides a machine having a plurality of vertically staggered scrubbing brushes coextensive with the height of the tile wall so that the machine may be positioned adjacent the wall with the scrubbing brushes in contact with the wall surface. A motor, rotating the brushes, moves the machine parallel to the wall in a scrubbing action with water and detergent periodically applied to the wall forwardly of the direction of movement of the uppermost scrubbing brush.

### SUMMARY OF THE INVENTION

An upright frame horizontally journals a plurality of stub shafts having scrubbing brushes connected to one end of the shafts in vertical staggered relation. A chain, entrained around sprockets on the stub shafts, is motor driven through belt and pulley means connected to one of the stub shafts. A roller is journaled by the respective ends of the base portion of the frame through pivoting linkage for engaging motor driven belts and moving the frame in a forward or reverse direction along a wall being scrubbed. One of these rollers, when engaged with a supporting floor, permits the machine to be positioned adjacent a wall and moved in one direction parallel to the wall with the scrubbing brushes contacting the wall. After

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a scrubbing pass along the wall this roller is retracted and the other roller engaged with the floor for moving the frame back to its point of beginning. Buffing pads are then placed over the scrubbing brushes and the action repeated for drying or polishing the scrubbed wall.

It is, therefore, the principal object of this invention to provide a power driven machine having a plurality of scrubbing brushes arranged in vertically staggered overlapping relation, with respect to its direction of travel, for scrubbing and buffing a wall surface.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a perspective view of the machine;

FIGURE 2 is a perspective view, similar to FIG. 1, of the opposite side and end of the machine;

FIGURE 3 is an elevational side view, to a larger scale, partially in section, taken substantially along the line 3—3 of FIG. 4;

FIGURE 4 is an end elevational view taken substantially along the line 4—4 of FIG. 3;

FIGURE 5 is a side elevational view, partially in section, taken substantially along the line 5—5 of FIG. 4; and,

FIGURES 6 and 7 are fragmentary perspective views, to a different scale, of one of the machine propelling rollers in retracted and extended floor engaging position, respectively.

### DESCRIPTION OF THE PREFERRED EMBODIMENT

Like characters of reference designate like parts in those figures of the drawings in which they occur.

In the drawings:

The reference numeral 10 indicates the machine, as a whole, having an open-type downwardly open frame 12 enclosed by opposing side panels 14 and 16, forward and rearward and panels 18 and 20, respectively, and a top 22 to form a rectangular cabinet which is supported in upright fashion by forward and rearward casters 24 and 25, respectively. The frame 12 is formed of suitable material, such as angle iron, and includes upright corner members 26, 28, 30 and 32 which are interconnected by horizontal top members, only three being shown at, 34, 36 and 38 and base members 40 and 42. A plurality of interconnected upright and horizontal braces 44 and 46, respectively, of similar material connected with selected ones of the upright and horizontal frame members, support the components hereinafter described.

A motor M, having a drive pulley 48, drives a relatively large pulley 50 by a belt 52. The pulley 50 is mounted on a horizontal axle 54 journaled by bearings 56 mounted on a pair of the horizontal braces 46. A second pulley 58, mounted on the axle 54, drives a third pulley 60 by a belt 62. The third pulley 60 is mounted on a horizontal chain driving axle 64 journaled by bearings 66 mounted on horizontal braces 46. A plurality of horizontal stub shafts 68, 70, 72, 74, 76 and 78, each journaled by suitable bearings, are mounted on horizontal braces 46 in vertical staggered relation adjacent the side wall 14. One end portion of the stub shafts 68, 70, 74, 76 and 78 project through the side wall or panel 14 and are coaxially connected with a like plurality (5) of circular scrubbing brushes 80, 82, 84, 86 and 88 so that the brushes 80—88 lie in a vertical plane and extend substantially the full distance of the panel 14 in vertical staggered relation. A driving sprocket 90 is mounted on the axle 64 and identical driven sprockets 92 are mounted on each of the stub shafts 68—78. A chain 94 is entrained around the driving sprocket 90 and the driven sprockets 92 for rotating the brushes 80—88. The bearings, mounting the stub shaft 72, are movable along its supporting braces 46 for adjusting the tension of the chain 94.

A cylindrical forward driving roller 96 and a reverse or rearward driving roller 98 is mounted at the respective end portions of the frame base for moving the device 10 in opposing directions parallel with a wall being washed, not shown. Since the rollers 96 and 98 and their mounting means are substantially identical, only the roller 96 is described in detail.

Referring more particularly to FIGS. 6 and 7, the roller 96 is connected by the respective end portions of its axle 100 to one end portion of a pair of links 102 pivotally connected, adjacent their other ends, to a rod 104 extending between the frame base side members 40 and 42. A control rod 106 extends between and is journaled, by vertically disposed frame side base plates 108, above the roller 96. One end portion of the control rod 106 projects outwardly of the frame panel 16 and is turned upwardly to form a handle 110 for the reasons presently apparent. A pair of arms 112 are rigidly connected at one end to the control rod 106 in spaced-apart relation. The spacing being substantially equal to the length of the roller 96. A pair of connecting links 114 are pivotally connected at their respective end portions to the roller axle 100 and to the free end portion of the arms 112. Thus, when the handle 110 is manually moved downwardly in the direction of the arrows (FIG. 2), the roller 96 is pivoted downwardly toward the plane of a supporting surface, such as a floor, so that the roller 96 projects downwardly beyond the plane of the lowermost limit of the forward casters 24 which, in effect, lifts the forward end portion of the frame 12 off of the floor so that the device 10 is supported by the roller 96 and the rearward casters 25. Downward pivoting movement of the roller 96, toward the floor, is stopped in an off-center locking action of the arms 112 and the links 114 by stops 116, connected with the respective connecting link 114, adjacent its end opposite the roller axle 100, wherein the stops 116 contact the control rod 106 (FIG. 7). Thus the roller 96 remains in frame supporting position until the handle 110 is again moved to an upright position. The reverse roller handle is indicated by the numeral 111.

Referring also to FIG. 5 the roller 96 is driven by a belt 118 entrained around a pulley 120 connected with one end of the roller axle 100. The belt 118 is also entrained around a pulley 122 mounted on an axle 124 and journaled by bearings mounted on horizontal braces 46. A roller speed reducing pulley 126, mounted on the axle 124, is driven by a belt 128 entrained around a pulley 130 mounted on the chain driving axle 64. The other or reversing roller 98 has its pulley 120 driven by a belt 119 entrained around a larger pulley 134 mounted on the stub shaft 78. The size of the pulleys forming the belt and pulley means 48, 50 and 52, 58, 60 and 62, are chosen so that they form a speed reducing means to drive the chain 94 at a desired rate of travel and a resultant desired rotational speed for the brushes 80-88. Similarly the belt and pulley means 118, 120, 126, 128 and 130, driven by the axle 64, reduces the rotational movement of the roller 96 about its axle 100 to a desired relatively slow rate of travel to insure the rotational movement of the brushes, in combination with their forward movement, perform an efficient cleaning action on a wall surface. Conversely, the ratio of the pulley 134, driving the pulley 120 on the reverse roller 98 by the belt 119, is such that the rotational speed of the reverse roller 98 is increased, to a rate faster than that of the chain driven stub shaft 78, so that the device 10 may be moved parallel to the wall and back to its starting point in a relatively short time.

A tank 135, containing a quantity of water, detergent (also liquid wax, if desired) not shown, and air under pressure, is supported by a platform 137 within the frame. The tank is connected with a conduit 136 terminating in a nozzle 138 projecting through the wall panel 14 adjacent but spaced forwardly of the uppermost brush 88 for intermittently spraying water and detergent on the sur-

face of the wall being washed. A valve 140, interposed in the conduit 136 and positioned on the outer surface of the forward panel 18, is operated to apply the water and detergent.

#### OPERATION

In operation the device 10 is positioned adjacent a wall to be washed, not shown, with the brushes 80-88 contacting the wall. The motor M, connected with a source of electrical energy, not shown, is started by closing a switch, not shown. This starts the brushes 80-88 to rotating. The handle 110 is pivoted downwardly in the direction of its arrow (FIG. 2) to a horizontal position which lowers the roller 96 into contact with the floor which lifts the forward end portion of the machine, tightens the belt 118 for pulley driving contact, and moves the machine forwardly, to the left as viewed in FIG. 3, while simultaneously rotating the scrubbing brushes. The operator periodically opens the valve 140 to spray water and detergent on the wall which is picked up by the rotating brushes during their scrubbing action and movement of the machine. The desired position of the machine, with respect to the wall, is maintained by the operator using a guiding handle 142 on the front panel 18. When the machine reaches the opposite end of the wall, the roller 96 is lifted out of contact with the floor and the roller 98 is lowered by means of its handle 111 to lift the rearward end of the machine and tighten the belt 119 to pulley driving contact which then moves the machine back to its point of beginning.

A conventional buffing pad, not shown, may then be attached to each scrubbing brush and the action of the machine repeated to move the brushes, having buffing pads thereon, along the wall to dry and polish it.

Obviously the invention is susceptible to some change or alteration without defeating its practicability, and I therefore do not wish to be confined to the preferred embodiment shown in the drawings and described herein.

I claim:

1. A wall scrubbing and buffing apparatus, comprising: a mobile frame; wall scrubbing means projecting laterally of and supported by said frame, said wall scrubbing means comprising a plurality of horizontal stub shafts journaled by said frame, and a like plurality of scrubbing brushes connected to one end portion of said stub shafts; a motor connected with said frame, said motor having a drive shaft and having a drive pulley thereon; driving means connecting said motor with said wall scrubbing means, said driving means including, a plurality of axles transversely journaled by said frame, other pulleys mounted on said axles forming aligned pairs of pulleys, endless flexible members entrained around respective pairs of pulleys and drivably interconnecting said driving pulley with one said axle, and stub shaft driving means on said one axle; and mobile means connected with said driving means for moving said apparatus in either direction along a wall to be scrubbed.

2. Structure as specified in claim 1 in which the last mentioned means comprises: a driving sprocket on said one axle; a driven sprocket on each said stub shaft; and a chain entrained around said driving sprocket and said driven sprockets.

3. Structure as specified in claim 2 in which said frame includes a base portion and said mobile means comprises: a roller; and means connecting said roller to the respective end portion of said frame base portion transversely of the direction of travel of said apparatus along a wall to be scrubbed.

4. Structure as specified in claim 3 in which the last mentioned means comprises: a roller axle projecting coaxially outward of the respective end of said roller; a roller mounting axle extending between opposing sides of said frame; a pair of links extending between and pivotally connected with said roller axle and said roller mounting axle at the respective ends of said roller for vertical piv-

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oting movement of said roller about the axis of said roller mounting axle; a control rod extending between opposing sides of said frame; a pair of arms rigidly connected to said control rod in spaced-apart parallel laterally extending relation; and a pair of connecting links extending between and pivotally connected with said roller axle and the free end portion of said arms at the respective ends of said roller, said control rod having a handle portion for rotating it about its longitudinal axis and moving said roller toward and away from a supporting surface.

5. Structure as specified in claim 4 and a roller pulley mounted on said roller axle; a roller driving pulley

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mounted on one axle of said plurality of axles; and a belt entrained around the last mentioned pulleys.

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EDWARD L. ROBERTS, Primary Examiner

U.S. Cl. X.R.

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