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FLOOR MACHINE WITH RETRACTABLE WHEELS AND
ADJUSTABLE HANDLE ASSEMBLY

2,949,619

Filed April 11, 1957

2 Sheets-Sheet 1

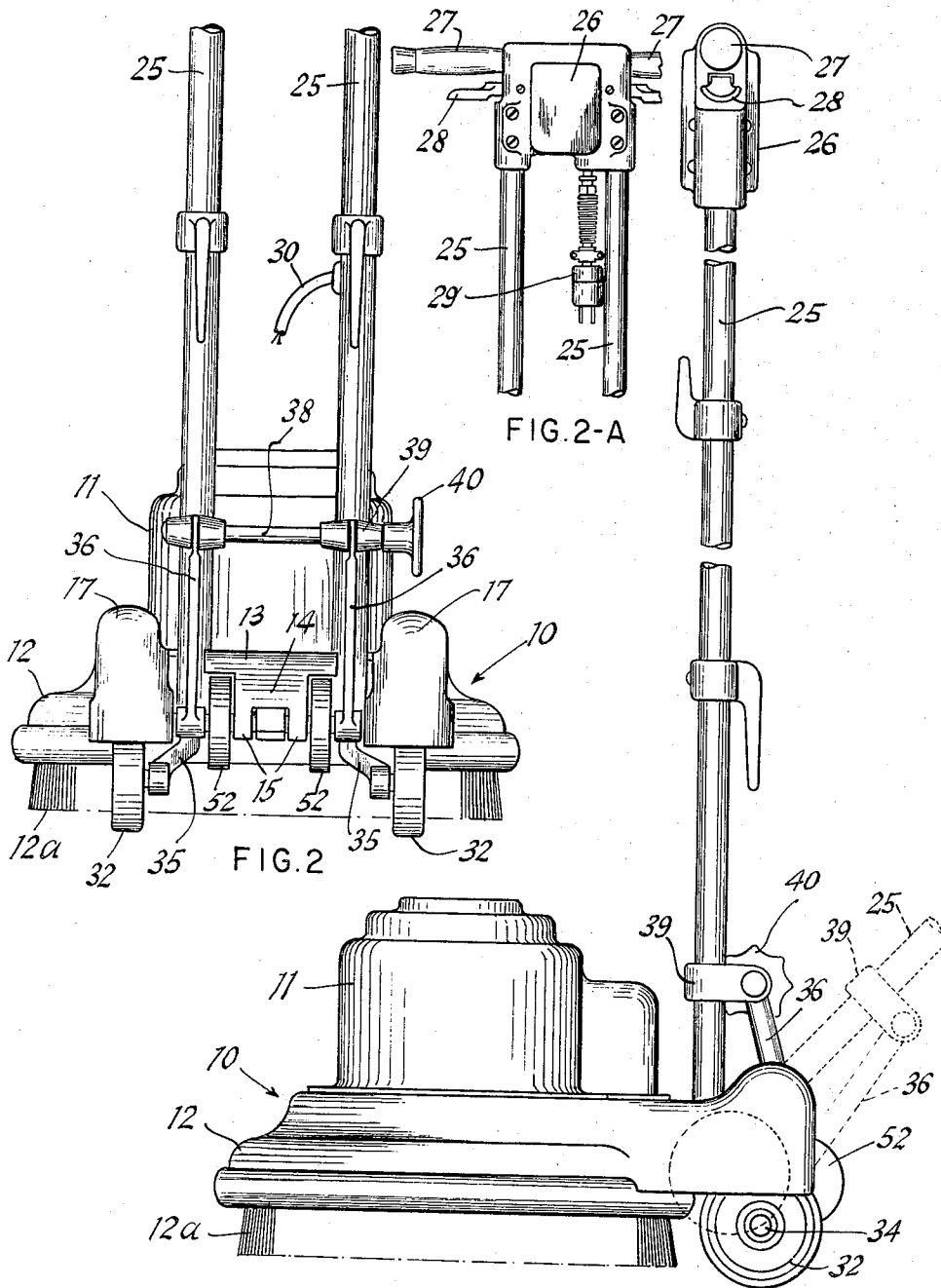


FIG. 1

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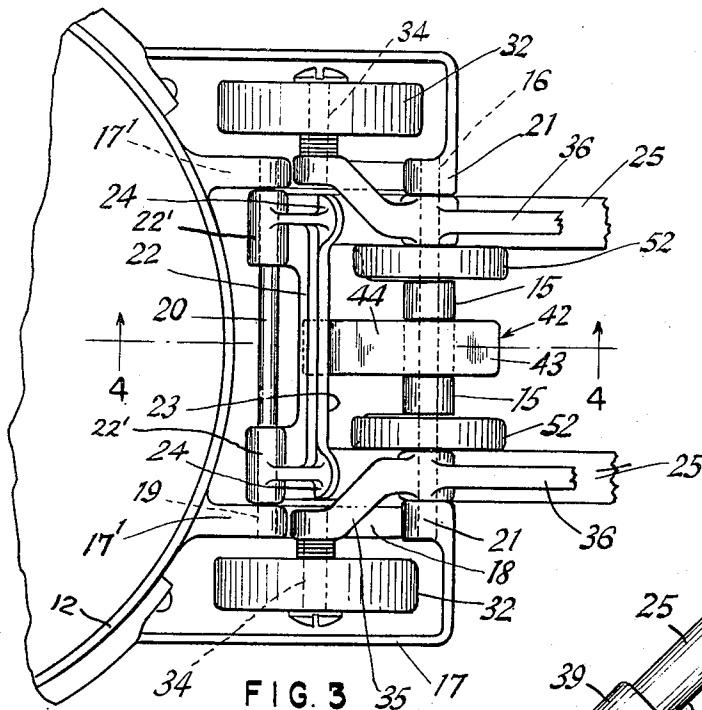


FIG. 3

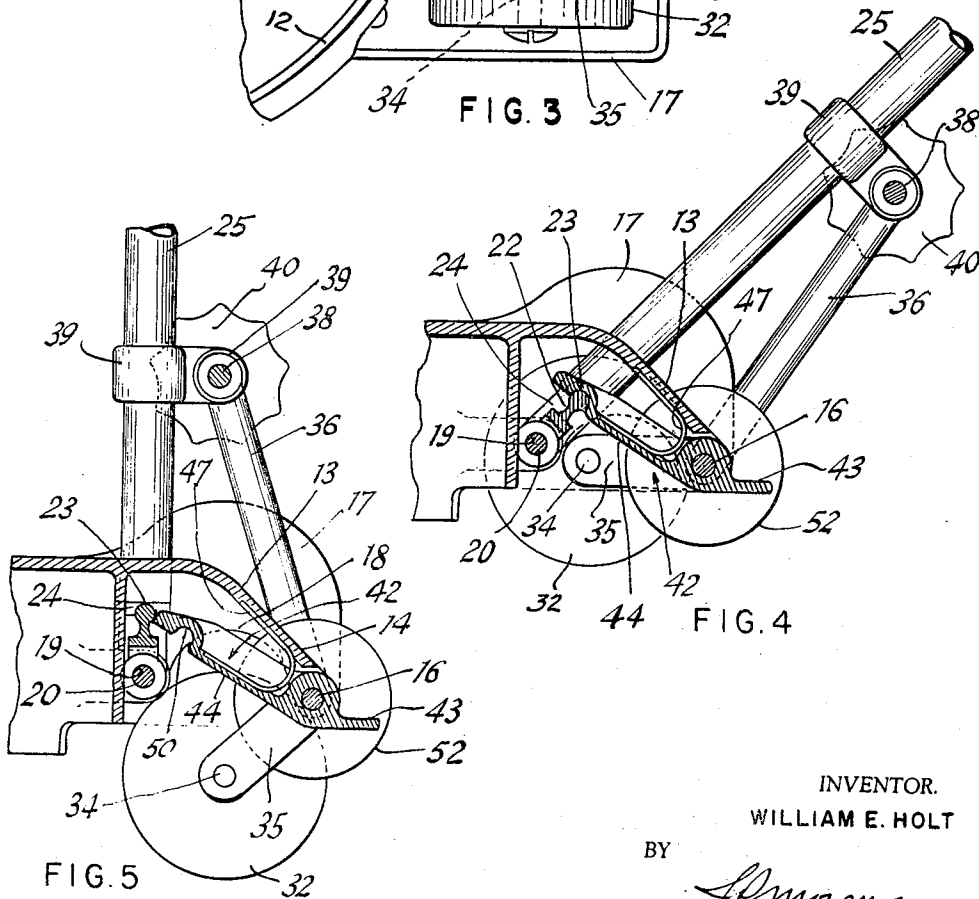


FIG. 5

FIG. 4

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FLOOR MACHINE WITH RETRACTABLE WHEELS AND ADJUSTABLE HANDLE ASSEMBLY

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7 Claims. (Cl. 15-49)

The present invention relates to the construction of floor maintenance machines having retractable supporting wheels operable by an adjustable handle assembly, and more particularly, to floor maintenance machines of the character described in which the handle assembly is movable between a lower angular normal operating position in which the wheels are raised and an upper upright transport or storage position in which the wheels are in a lowered position.

The main object of the present invention is the provision of a floor maintenance machine of the character described having simple compact low cost provisions for releasably locking the supporting wheels and handle assembly in their normal operating and transport or storage positions. Another object is the provision of a pair of auxiliary wheels arranged to facilitate transportation of the machine up and down stairs. A further object is an improved relative arrangement of the auxiliary wheels and releasable locking means in which the wheels are positioned in a location permitting easy access to the locking means and the locking means are located and proportioned so as to avoid interference with the operation of the auxiliary wheels.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which I have illustrated and described a specific embodiment of my invention.

Of the drawings:

Fig. 1 is an elevation of a floor maintenance machine embodying the present invention with the supporting wheels and handle assembly in the transportation or storage position;

Fig. 2 is a rear view of the lower portion of the machine shown in Fig. 1;

Fig. 2-A is a rear view of the upper portion of the machine shown in Fig. 1;

Fig. 3 is a fragmentary bottom view of the supporting and auxiliary wheels and locking provisions;

Fig. 4 is a fragmentary section taken on the line 4-4 of Fig. 3, showing the supporting wheels and handle assembly in the normal operating position; and

Fig. 5 is a view of the parts shown in Fig. 4 in the transport or storage position.

The floor maintenance machine illustrated includes a metal housing 10 having a substantially cylindrical top section 11 enclosing an electric drive motor (not shown) and an enlarged circular downwardly curving base section 12. The base section surrounds the upper portion of a removable rotary surfacing element, such as a rotary brush 12a, arranged to rotate about a vertical axis with the lower ends of the brush bristles in contact with the floor.

The rear portion of the circular housing base section 12 has a rearwardly and downwardly curving center ex-

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tension 13, the lower portion 14 of which is reduced in width and terminates in a pair of transversely spaced aligned hubs 15, through which passes an axle 16. The housing also has a pair of wheel-enclosing auxiliary housings 17 projecting rearwardly thereof and symmetrically arranged relative to and transversely spaced from the center extension 13. The inner wall 17' of each auxiliary housing 17 is cut away to form a relatively large recess 18 extending from its lower edge. Each remaining portion adjacent the base section 12 has an opening 19 therethrough arranged to receive the corresponding end of a transverse axle 20 extending parallel to and slightly above the level of the axle 16. The lower rearmost part of each wall 17' is formed with a hub 21 aligned with, but spaced from, the hubs 15 and receiving the corresponding end of the axle 16.

A dual handle assembly is rotatably mounted on the axle 20. The handle assembly comprises an I-shaped cross-bar 22 at its lower end having a pair of projecting hubs 22' mounted on the axle 20 adjacent the housing inner walls 17'. The transversely extending section of the cross-bar 22 has a rounded upper edge 23 for a purpose hereinafter described. The upper end projections of the cross-bar 22 form spaced stubs 24, to which are secured tubular members 25 of the handle assembly. The upper ends of the tubes 25 fit into the lower end of a switch box 26. Rubber covered handle grips 27 project from opposite sides of the switch box. A safety grip switch 28 of the momentary contact type is arranged below each handle grip 27, so that the machine will stop the instant the operator releases his grip. An electric power cable connection 29 is secured to the switch box and electrical conductors 30 extend through one of the handle tubes to the electric motor of the machine. The described dual handle assembly gives a positive control over the position of the machine at all times and reduces operator fatigue by spreading the load and minimizing the effects of torque on the handle grips.

The machine may be readily transported when not in operation on a pair of wheels 32 positioned within the auxiliary housings 17 at the rear of the machine. Each of the wheels 32 is rotatably mounted on a stub axle 34 arranged parallel to the axles 16 and 20 and extending outwardly from the downwardly and outwardly bent lower leg 35 of a bell-crank lever pivotally mounted on the axle 16 at the inner side of the corresponding hub 21. The lower end of the leg 35 projects into the corresponding recess 18. The upper leg 36 of each bell-crank lever is bent at an obtuse angle to the leg 35 and has its upper end pivotally connected to a bolt 38, which passes through the ends of a split collar 39 encircling one of the handle tubes 25. One of the collars is adjustably clamped to the corresponding tube 25 by securing one split end of the collar to the bolt and moving a threaded adjusting knob 40 on the bolt end to force the other split end of the collar into clamping engagement with the tube. With this construction, and the adjusting knob loosened, the dual handle can be moved angularly about the axle 20. At the same time the wheels 32 through the action of the bell-crank levers are raised or lowered as the handle assembly is moved rearwardly or forwardly respectively. The adjusting knob 40 can be tightened to hold the handle assembly at any desired angle within its range of angular movement relative to the housing 10.

The handle assembly is angularly movable relative to the housing between a lower angular position representing its normal operating position and a substantially upright transport or storage position and releasably locked in each of these positions by a toe latch mechanism capable of being actuated by the operator's foot. As shown in Figs. 4 and 5, a latch member 42 having a rear horizontal leg 43 and a forward leg 44 inclined at an

obtuse angle thereto, is advantageously pivotally mounted on the axle 16 between the hubs 15. The upper leg 44 of the latch is proportioned to have its forward end in abutting relation to the rounded upper edge 23 of the cross-bar 22, preventing any rearward angular or clockwise movement of the cross-bar, but also preventing any further downward movement of the front leg of the latch member, when the handle assembly is in its upright position for transport or storage of the machine. The forward leg of the latch member is continuously resiliently pressed downwardly by a U-shaped leaf spring 47 positioned between the upper surface of this leg and the under surface of the housing center extension 13. The center extension 13 is recessed on its underside to hold the spring 47 in its operating position.

When it is desired to move the handle assembly rearwardly to its inclined normal operating position, the operator presses his foot on the rear leg 43 of the latch member 42, causing the forward end of the latch to rise out of its abutting position with the cross-bar 22. The cross-bar 22 moves rearwardly in an angular path, i.e. clockwise, with its rounded upper edge in contact with the lower surface of the latch member upper leg 44. At a position corresponding to the normal operating position of the handle assembly, the underside of the latch member upper leg is provided with a transverse recess 50 of semi-circular cross-section corresponding to the rounded upper edge 23 of the cross-bar 22. With this construction the latch member will snap over the cross-bar when the handle assembly reaches its normal operating position and lock the handle assembly in that position and the retractable supporting wheels 32 in their most elevated position above the contact level of the rotary brush with the floor. The latch member may be subsequently released by the operator's foot to allow the handle assembly to be moved forwardly and the supporting wheels lowered.

When the machine is to be transported, the handle assembly is moved to its extreme forward position wherein the supporting wheels will be in their lowermost position. The machine is tilted to clear the rotary brush from the floor and the entire weight taken by the wheels 32. The present machine advantageously embodies an auxiliary set of supporting wheels for facilitating movement of the machine up and down stairs. For this purpose a pair of wheels 52 are rotatably mounted on the axle 16 between the bell-crank lever arms 36 and the hubs 15 formed on the housing center extension 13. The wheels 52 are made of a diameter sufficient to cause them to extend beyond the rear end of the latch member 42 therebetween. This arrangement insures that the stairs will be adequately protected from injury by the latch member, yet affording sufficient space for access thereto by the operator's foot.

While in accordance with the provisions of the statutes I have illustrated and described herein a specific form of the invention now known to me, those skilled in the art will understand that changes may be made in the form of the apparatus disclosed without departing from the spirit of the invention covered by my claims, and that certain features of the invention may sometimes be used to advantage without a corresponding use of other features.

What is claimed is:

1. A floor maintenance machine comprising a main housing, a rotary floor treating element positioned within said main housing, a pair of laterally spaced auxiliary housings projecting rearwardly from the rear side of said main housing, a handle assembly pivotally mounted in and extending between said auxiliary housings, an axle mounted in and extending between said auxiliary housings rearwardly of the pivot axis of said handle assembly, a pair of bell-crank levers pivotally mounted on said axle, a pair of housing supporting wheels carried on the forward ends of said bell-crank levers and posi-

tioned within said auxiliary housings, means forming a pivotal connection between the rear ends of said bell-crank levers and said handle assembly and arranged to raise and lower said supporting wheels relative to said rotary floor treating element on movement of said handle assembly from an upright transport or storage position and a lower inclined operating position, respectively, and means for automatically locking said handle assembly in said lower inclined operating position and also when in said upright transport or storage position.

2. A floor maintenance machine comprising a main housing, a rotary floor treating element positioned within said main housing, a pair of laterally spaced auxiliary housings projecting rearwardly from the rear side of said main housing, a cross-bar pivotally mounted in and extending between said auxiliary housings, a handle assembly mounted on said cross-bar, an axle mounted in and extending between said auxiliary housings rearwardly of and extending parallel to said cross-bar, a pair of bell-crank levers pivotally mounted on said axle, a pair of housing supporting wheels carried on the forward ends of said bell-crank levers and positioned within said auxiliary housings, means forming a pivotal connection between the rear ends of said bell-crank levers and said handle assembly and arranged to raise and lower said supporting wheels relative to said rotary floor treating element on movement of said handle assembly from an upright transport or storage position and a lower inclined operating position, respectively, and locking means arranged to positively engage said cross-bar when said handle assembly is in said lower inclined operating position and also when in said upright transport or storage position.

3. A floor maintenance machine comprising a main housing, a rotary floor treating element positioned within said main housing, a pair of laterally spaced auxiliary housings projecting rearwardly from the rear side of said main housing, a cross-bar pivotally mounted in and extending between said auxiliary housings, a handle assembly mounted on said cross-bar, an axle mounted in and extending between said auxiliary housings rearwardly of and extending parallel to said cross-bar, a pair of bell-crank levers pivotally mounted on said axle, a pair of housing supporting wheels carried on the forward ends of said bell-crank levers and positioned within said auxiliary housings, means forming a pivotal connection between the rear ends of said bell-crank levers and said handle assembly and arranged to raise and lower said supporting wheels relative to said rotary floor treating element on movement of said handle assembly from an upright transport or storage position and a lower inclined operating position, respectively, and a spring pressed toe latch member pivotally mounted on said axle and arranged to positively engage said cross-bar when said handle assembly is in said lower inclined operating position and also when in said upright transport or storage position.

4. A floor maintenance machine comprising a main housing, a rotary floor treating element positioned within said main housing, a pair of laterally spaced auxiliary housings projecting rearwardly from the rear side of said main housing, a handle assembly pivotally mounted in and extending between said auxiliary housings, an axle mounted in and extending between said auxiliary housings rearwardly of the pivot axis of said handle assembly, a pair of bell-crank levers pivotally mounted on said axle, a pair of housing supporting wheels carried on the forward ends of said bell-crank levers and positioned within said auxiliary housings, means forming a pivotal connection between the rear ends of said bell-crank levers and said handle assembly and arranged to raise and lower said supporting wheels relative to said rotary floor treating element on movement of said handle assembly from an upright transport or storage position and a lower inclined operating position, respectively,

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means for locking said handle assembly in said lower inclined operating position and said upright transport or storage position, and a pair of auxiliary supporting wheels rotatably mounted on said axle at opposite sides of said locking means, the lowermost peripheral portion of said auxiliary wheels being at a higher elevation than the lowermost peripheral portion of said housing supporting wheels in substantially all positions of the latter when the machine is generally upright.

5. A floor maintenance machine comprising a main housing of horizontal circular cross-section, a rotary floor treating element positioned within said main housing, a pair of laterally spaced auxiliary housings projecting rearwardly from the rear side of said main housing, a cross-bar pivotally mounted in and extending between said auxiliary housings, a handle assembly mounted on said cross-bar, an axle mounted in and extending between said auxiliary housings rearwardly of and extending parallel to said cross-bar, a pair of bell-crank levers pivotally mounted on said axle, a pair of housing supporting wheels carried on the forward ends of said bell-crank levers and positioned within said auxiliary housings, means forming a pivotal connection between the rear ends of said bell-crank levers and said handle assembly and arranged to raise and lower said supporting wheels relative to said rotary floor treating element on movement of said handle assembly from an upright transport or storage position and a lower inclined operating position, respectively, a spring pressed toe latch member pivotally mounted on said axle and arranged to positively engage said cross-bar when said handle assembly is in said lower inclined operating position and also when in said upright transport or storage position, and a pair of auxiliary supporting wheels rotatably mounted on said axle at opposite sides of and spaced from said latch member, the lowermost peripheral portion of said auxiliary wheels being at a higher elevation than the lowermost peripheral portion of said housing supporting wheels in substantially all positions of the latter when the machine is generally upright.

6. A floor maintenance machine comprising a main housing of horizontal circular cross-section, a rotary floor treating element positioned within said main housing, a pair of laterally spaced auxiliary housings projecting rearwardly from the rear side of said main housing, a cross-bar pivotally mounted in and extending between said auxiliary housings, a handle assembly mounted on said cross-bar, an axle mounted in and extending be-

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tween said auxiliary housings rearwardly of and extending parallel to said cross-bar, a pair of bell-crank levers pivotally mounted on said axle, a pair of housing supporting wheels carried on the forward ends of said bell-crank levers and positioned within said auxiliary housings, means forming a pivotal connection between the rear ends of said bell-crank levers and said handle assembly and arranged to raise and lower said supporting wheels relative to said rotary floor treating element on movement of said handle assembly from an upright transport or storage position and a lower inclined operating position, respectively, a spring pressed toe latch member pivotally mounted on said axle and arranged to positively engage said cross-bar when said handle assembly is in said lower inclined operating position and also when in said upright transport or storage position, and a pair of auxiliary supporting wheels rotatably mounted on said axle at opposite sides of and spaced from said latch member, said auxiliary supporting wheels having a radius greater than the rearwardly projecting portion of said latch member, the lowermost peripheral portion of said auxiliary wheels being at a higher elevation than the lowermost peripheral portion of said housing supporting wheels in substantially all positions of the latter when the machine is generally upright.

7. A floor maintenance machine comprising a main housing of horizontal circular cross-section, a rotary floor treating element positioned within said main housing, a pair of laterally spaced auxiliary housings projecting rearwardly from the rear side of said main housing, a handle assembly mounted on said auxiliary housings, an axle mounted in and extending between said auxiliary housings, a pair of housing supporting wheels positioned within said auxiliary housings, and a pair of auxiliary supporting wheels rotatably mounted on said axle between and projecting rearwardly beyond said auxiliary housings, the lowermost peripheral portion of said auxiliary wheels being at a higher elevation than the lowermost peripheral portion of said housing supporting wheels in substantially all positions of the latter when the machine is generally upright.

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