Dec. 16, 1952 O. L. BYE 2,621,350

COMBINATION FLOOR WASHING, SANDING, OILING, AND POLISHING MACHINE

Filed Jan. 9, 1948 5 Sheets-Sheet 1

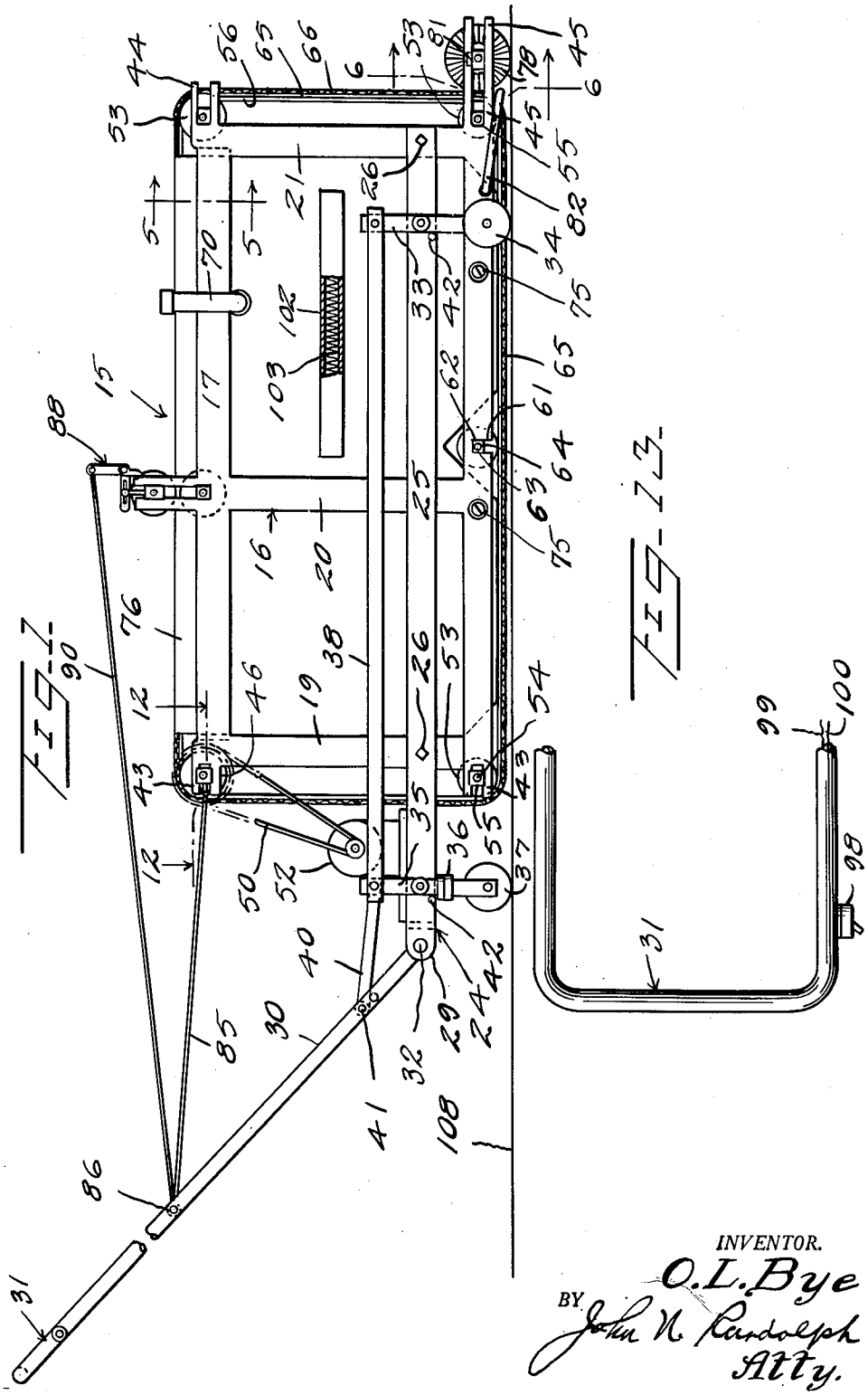


FIG. 1

FIG. 1A

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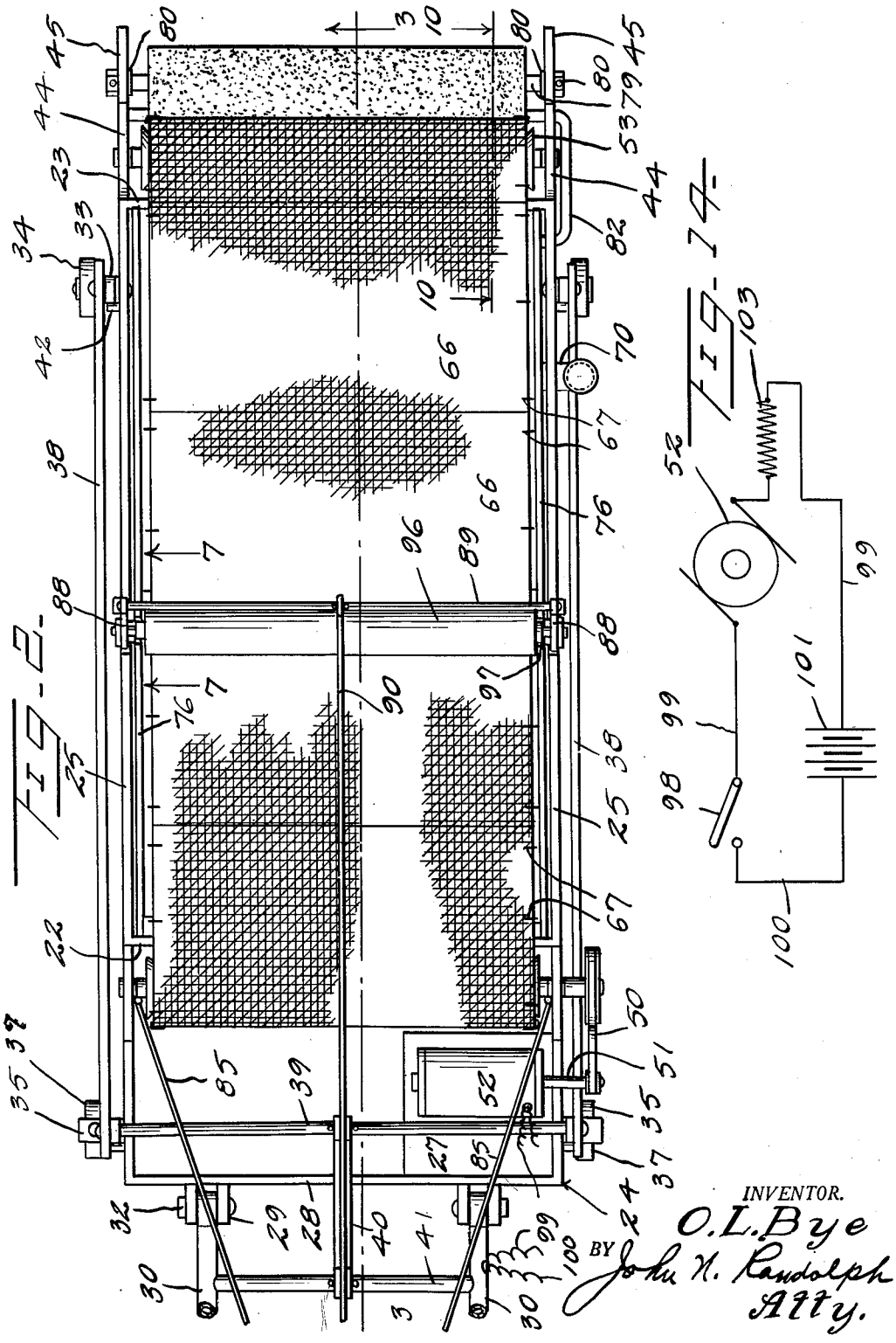


FIG. 2.

FIG. 14.

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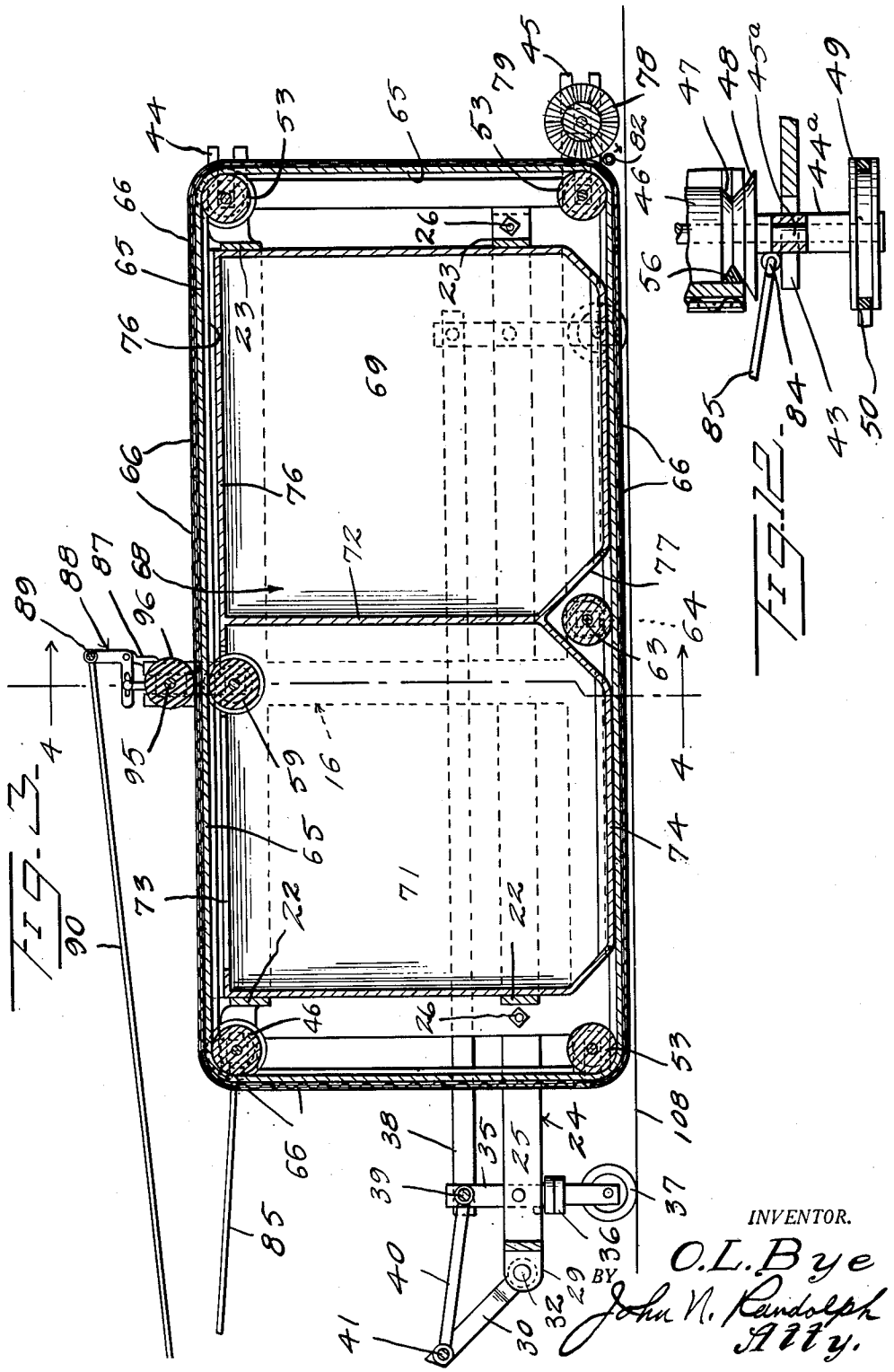


FIG. 3

FIG. 4

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COMBINATION FLOOR WASHING, SANDING, OILING, AND POLISHING MACHINE

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FIG. 4.

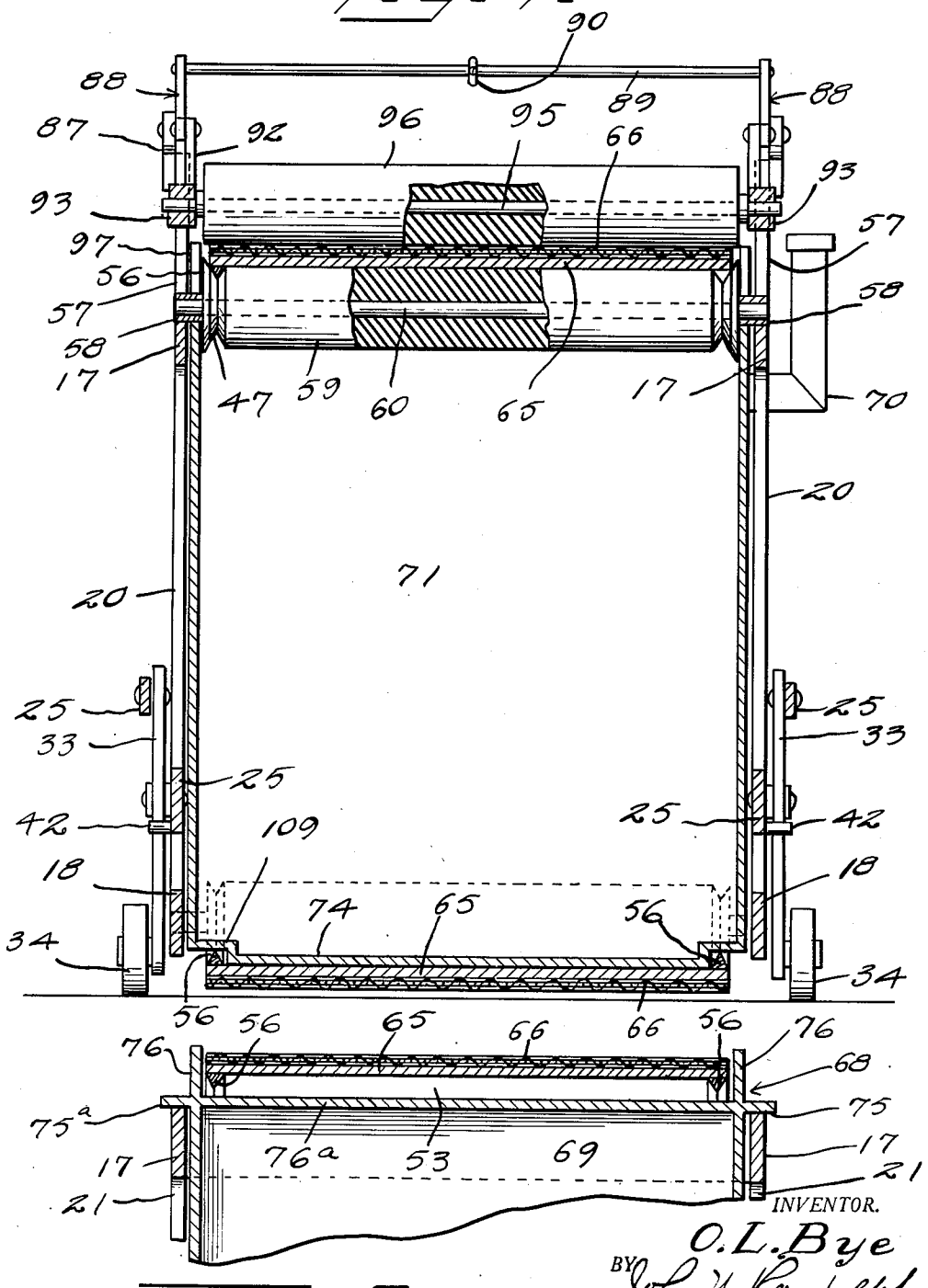


FIG. 5.

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Fig. 6.

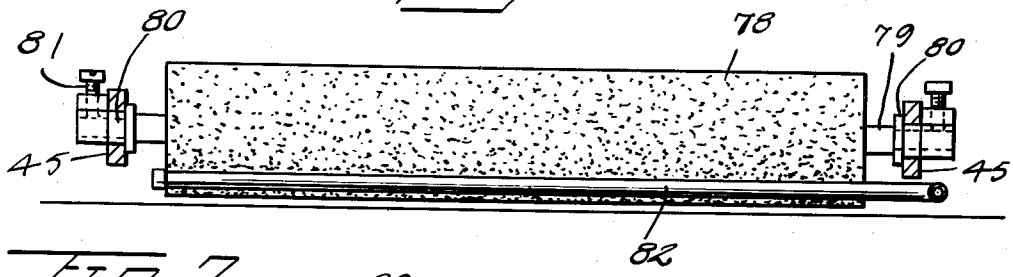


Fig. 7.

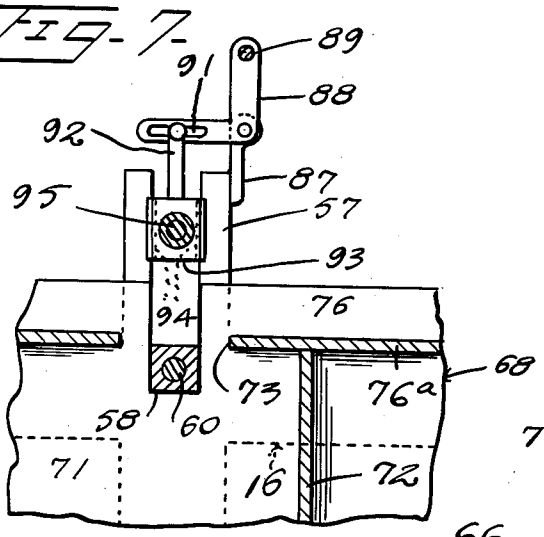


Fig. 8.

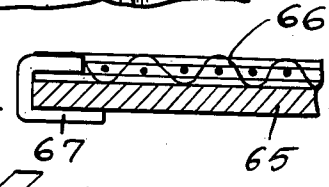


Fig. 10.

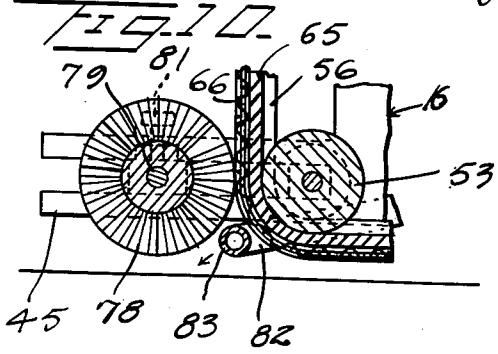


Fig. 11.

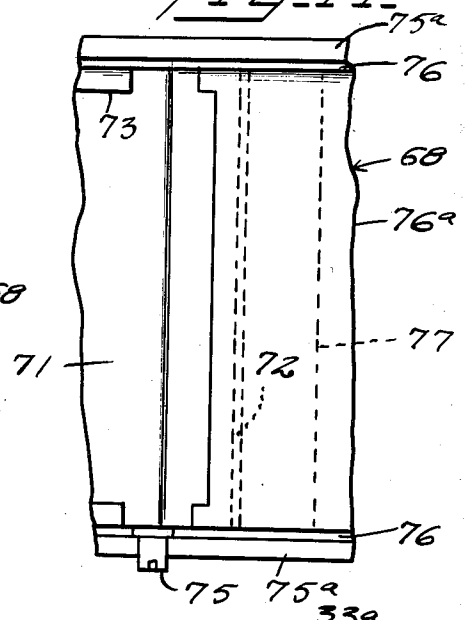
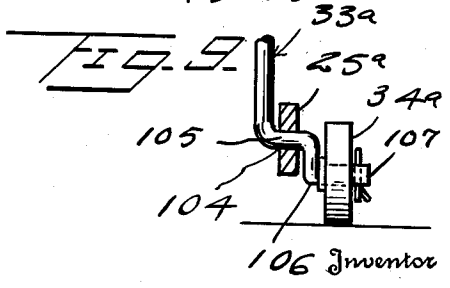


Fig. 9.



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UNITED STATES PATENT OFFICE

2,621,350

COMBINATION FLOOR WASHING, SANDING, OILING, AND POLISHING MACHINE

Ole L. Bye, Glendale, Calif.

Application January 9, 1948, Serial No. 1,396

5 Claims. (Cl. 15—51)

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This invention relates to an improved construction of machine for use in washing, sanding, oiling or waxing and polishing floors and is especially intended and adapted for use in large buildings having large uninterrupted floor spaces for affording a means whereby said floor spaces may be readily maintained in a clean, sanitary and well groomed manner.

More particularly, it is an object of the present invention to provide a machine for the aforedescribed purpose having adjustably disposed supporting wheels and a driven endless floor treating element displaceable by movement of said wheels either into or out of engagement with a floor surface.

Another object of the invention is to provide a machine as described and wherein the endless floor engaging element will function when in contact with a floor surface for propelling the machine as the floor treating operation is executed thereby.

Another object of the invention is to provide a machine of the aforedescribed character having means for discharging a treating liquid to the floor surface in advance of the endless floor engaging element.

Another object of the invention is to provide a machine having a driven brush disposed in advance of the liquid discharge thereof for brushing the floor surface ahead of the machine to remove loose dirt, trash and other debris therefrom.

Still a further object of the invention is to provide a machine having novel means for extracting the dirty cleaning liquids from the endless floor engaging element and for discharging the extract liquid into a receptacle for the purpose carried by the machine.

Still another object of the invention is to provide a machine of extremely simple construction and which may be readily converted for use either as a floor washer, sander, oiler or waxer, or polisher by the simple expedient of the substitution of one endless floor surface engaging element for another and the substitution of one liquid to be discharged from the machine for another.

Still a further object of the invention is to provide a machine of the aforedescribed character wherein the movement thereof can be readily controlled with a simple manipulation of a handle engaged by the machine operator and which is provided with a surface engaging wheel supported dolly constructed and arranged to facilitate and simplify the steering of the machine.

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Numerous other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, illustrating a presently preferred embodiment thereof, and wherein:

Figure 1 is a side elevational view showing the assembled machine in an inoperative position;

Figure 2 is a top plan view thereof partly broken away and on an enlarged scale;

Figure 3 is a longitudinal sectional view of the machine taken substantially along a plane as indicated by the line 3—3 of Figure 2;

Figure 4 is a transverse vertical sectional view of the machine taken substantially along a plane as indicated by the line 4—4 of Figure 3;

Figure 5 is an enlarged fragmentary transverse vertical sectional view taken substantially along a plane as indicated by the line 5—5 of Figure 1;

Figure 6 is a transverse vertical sectional view taken substantially along a plane as indicated by the line 6—6 of Figure 1;

Figure 7 is a longitudinal vertical sectional view taken substantially along a plane as indicated by the line 7—7 of Figure 2 and on an enlarged scale;

Figure 8 is an enlarged fragmentary transverse sectional view of a portion of the endless floor engaging element;

Figure 9 is a fragmentary transverse sectional view, partly in elevation of a modification of the invention;

Figure 10 is a fragmentary longitudinal vertical sectional view taken substantially along a plane as indicated by the line 10—10 of Figure 2;

Figure 11 is a fragmentary top plan view of a portion of the container, shown removed from the machine frame;

Figure 12 is a fragmentary horizontal sectional view on an enlarged scale and taken substantially along a plane as indicated by the line 12—12 of Figure 1;

Figure 13 is a fragmentary plan view of the outer end of the machine handle, and

Figure 14 is a diagrammatic view of the electric circuit of the machine.

Referring more specifically to the drawings, the combination floor washing, sanding, oiling or waxing and polishing machine, constituting the invention, is designated generally 15 and includes a skeleton machine frame, designated generally 16 composed of corresponding sides each including top and bottom rails 17 and 18, respectively, perpendicular bars or posts 19, 20 and 21 and transverse connecting bars 22 and 23 which ex-

tend between the complementary posts 19 and 21, respectively, and by means of which the corresponding side portions of the frame 16 are connected.

A dolly, designated generally 24 is disposed rearwardly of the machine frame 16 and is provided with side beams or bars 25 which extend along the outer sides of the two side sections of the frame 16. Said side beams 25 are detachably secured to the frame 16 by fastenings 26 which are engaged with the rear and front frame posts 19 and 21 for demountably supporting the dolly behind said frame 16. As best seen in Figure 2, the dolly 24 is provided with a platform 27 in a portion thereof disposed behind the frame, and the rear cross member 28 of said dolly is provided with pairs of rearwardly projecting apertured ears 29 for receiving the apertured terminals of the legs 30 of a substantially U-shaped handle 31 and which are connected pivotally to the ears 29 by fastenings 32.

A post 33 is pivotally connected intermediate of its ends to the outer side of each beam 25 adjacent the forward end thereof and said posts 33 are provided at their lower ends with surface engaging wheels 34 which are suitably journaled thereon. The beams 25, adjacent their rear ends and rearwardly of the frame 16 each pivotally support a post 35 which is pivotally connected thereto intermediate of the ends thereof. Each of the posts 35 is provided with a lower, outwardly offset portion having a swivel joint 36 and on the lower end of which is journaled a surface engaging caster wheel 37. The upper ends of the posts 33 and 35 which are disposed at corresponding sides of the machine 15 are connected by a link 38 which links are pivotally connected to said posts. The upper portions of the rear posts 35 are connected by a cross rod 39 which is disposed over the rear portion of the dolly 24 and to which is connected the forward end of a link 40 which extends rearwardly therefrom and is pivotally connected at its rear end to a cross brace 41 which extends between the legs 30 of the handle 31, as best seen in Figure 2. As seen in Figure 1, the side beams 25 are provided with outwardly projecting pins or stops 42 to limit the swinging movement of the posts 33 and 35 in clockwise directions and to prevent their movement past perpendicular positions.

As seen in Figure 1, the side portions of the frame 16 at the corners thereof are provided with slotted rear extensions 43 and slotted forward extensions 44 and 45. The complementary upper rear extensions 43 provide means for slidably receiving bearing elements 44*a*, as best seen in Figure 12, in which are journaled portions of a shaft 45*a* to which is secured a roller or pulley 46 which is located between said upper rear slotted extensions 43 and which is provided adjacent each end thereof with a V-shaped annular groove 47 and a beveled flanged end 48. A driven pulley 49 is keyed to one end of the shaft 45*a* outwardly of one of said bearings 44*a* and externally of the frame 16 and has an endless belt 50 trained thereover and which is trained over the pulley of a drive shaft 51 of a motor 52 which is secured to the platform 27, as best seen in Figure 2 and which is preferably an electric motor.

The lower slotted extensions 43 and the extensions 44 and extensions 45 each provide means for journaling a roller or pulley 53, corresponding to the pulley 46 and having a shaft 54 fixed thereto and projecting from the ends thereof and which is journaled in bearing blocks 55 which are slidably disposed in the slotted extensions 43, 44 or 45. An endless belt 56 is trained over the pulley or roller 46 and the three pulleys 53 at each end of said pulleys and said belts 56 are of V-shaped cross section to engage in the corresponding grooves 47 thereof. As seen in Figures 1 and 4, the upper frame portions 17 are provided intermediate of their ends with upstanding slotted standards 57 each of which is adapted to slidably engage a bearing block 58. A pulley 59, corresponding to the pulleys or rollers 53 is disposed between the standards 57 and is fixed to a shaft 60 the ends of which are journaled in said bearing blocks 58 and said pulley 59 is likewise provided with grooves 47 over which the two V-shaped belts 56 are trained.

As seen in Figure 1, the bottom side rails 18 are provided with downwardly opening slots 61 for bearing blocks 62 which journal a shaft 63 which is keyed to a pulley or roller 64, which likewise corresponds to the pulleys 53 and under which the belts 56 are trained and which pulley 64 is disposed at substantially the same level as the bottom pulleys 53.

An endless surface engaging member or belt 65 is trained over the pulleys 46, 53, 59 and 64 and is disposed on the outer side of said pulleys and is of a width, as illustrated in Figure 4, to extend to said side flanges 48 and to overlie the belts 56.

The belt 65, in the embodiment for application of the invention as illustrated is provided with cleaner pads or screens 66 which are detachably connected to the exterior side thereof and each of which screens 66 extend transversely of the belt 65 and is provided at its ends with hooks 67 which engage around the side edges of the belt 65, as best seen in Figure 8 for detachably connecting the screens 66 thereto. The screens 66 are each of a length substantially equal to the width of the belt 65 and are preferably of a width of approximately six or seven inches.

From the preceding description it will be readily apparent that the belt 65 can be applied to or removed from the frame 16 when the dolly 24 is demounted and other endless cleaning, sanding, polishing, oiling or waxing belts or endless elements may be readily substituted for the belt 65.

With the belt 65 and the pulley 59 and shaft 60 removed, a tank, designated generally 68 is adapted to be mounted in the machine frame 16 and with the ends thereof disposed between the cross members 22 and 23 which retain the tank 68 against longitudinal displacement relatively to the frame 16. The tank 68 is provided with a closed forward compartment or chamber 69 which, when used with the cleaning belt 65 is adapted to contain water and which may be filled through a normally closed filling neck 70 which extends outwardly and upwardly from one side thereof. The tank 68 is also provided with a rear chamber 71 which is separated from the chamber 69 by a common partition or wall 72 and which is provided with an open top 73, for a purpose which will hereinafter become apparent. The chambers 69 and 71 are provided with drain outlets on corresponding sides thereof and adjacent the tank bottom 74 and which are normally closed by removable closures or plugs 75 which may extend through one of the bottom frame members 18 to assist in securing the tank 68 in the frame 16 and as seen in Figure 1, the filling neck 70, which is likewise removable, preferably engages under one of the upper frame members 17 to also function to retain the tank

in position in said frame. As best illustrated in Figure 5, the tank 68 is provided with outwardly projecting side flanges 75a disposed substantially at the level of the top wall 76a of the chamber 69 and which rest upon the upper edges of the frame members 17 for supporting the tank 68 within said frame 16. The tank 68 is also provided with upstanding side flanges 76 forming upper extensions of the side walls of the tank 68 and between which the upper flight of the belt 65 is disposed, as clearly illustrated in Figure 5. As seen in Figure 3, the tank bottom 64 is provided with a V-shaped arch portion 77 the upper part of which merges with the lower end of the partition 72 and which is provided to accommodate the bottom intermediate roller 64. The side walls of the chamber 71 are recessed to accommodate the shaft 60, as clearly illustrated in Figure 4. Accordingly, it will be readily apparent that the roller or pulley 59 is partially disposed within the tank chamber 71 and has a portion thereof extending upwardly therefrom through the opening 73.

As best illustrated in Figures 1, 2, 6 and 10, a rotary sweeper or brush 78 is disposed forwardly of the bottom flight of the endless element or belt 65 and is fixed to a shaft 79 which is journaled in bearing blocks 80 which are slidably disposed in the forward slotted extensions 45 which are elongated for this purpose. A clamping member 81 is associated with each bearing 80 for clamping it relatively to its extension 45 for adjustably positioning the brush 78 forwardly of the front flight of the belt 65. The lowermost part of the brush 76 is disposed at substantially the same level as the pads or screens 66 or the bottom flight of the belt 65 and said brush 78 is adjustably positioned by the clamping means 81 so that a portion of its periphery will be sufficiently in contact with the belt 65 or pads 66 to be driven by its engagement therewith and revolved in the opposite direction to that in which the belt is moving and for a purpose hereinafter to become apparent.

A conduit 82 extends from a side of the tank chamber 69, near the bottom thereof and has a free end portion extending substantially through the space between and beneath the belt 65 and brush 78 and said last mentioned portion of the pipe or conduit 82, as best seen in Figure 10, is provided with longitudinally spaced apertures 83 forming a manifold discharge and which are directed downwardly and forwardly with respect to the machine 15.

The bearings 44a, associated with the upper rear roller or pulley 46, as best seen in Figure 12, are each provided with a rearwardly projecting eye 84 (Fig. 12) to which an end of a flexible member 85 is anchored. The flexible members 85 extend rearwardly from said eyes 84 and are connected at their rear ends to a second cross bar 86 of the handle 31 and which extends between the legs 30 thereof at a point outwardly of the cross bar 41.

Referring particularly to Figures 4 and 7, the forwardly disposed edges of the slotted standards 57 are provided with integral extensions 87 which rise therefrom and to the upper end of each of which a bell crank 88 is pivotally mounted at its apex. The two bell cranks 88 have corresponding legs which normally extend upwardly therefrom and which are connected to one another adjacent their upper ends by a rod 89 which extends therebetween and to the intermediate portion of which one end of a flexible member 90 is anchored. The flexible member 90 extends rearwardly from the rod 89 and is anchored at its opposite end to the cross rod 86. The other, normally horizontally disposed and rearwardly extending legs of the bell cranks 88 are each provided with an elongated, longitudinally disposed slot 91 to which a hanger 92 is slidably and pivotally connected. Each hanger 92 supports a bearing block 93 which is slidably disposed in the slot of the standard 57 above which the bell crank 88, by which said bearing block is supported is mounted. The bearing blocks 93 are provided with grooves 94 in the side edges thereof, as seen in dotted lines in Figure 7, for slidably engaging the inner edges of the legs of the standards 57 for retaining said bearing blocks 93 against lateral displacement relatively thereto. The bearing blocks 93 journal end portions of a shaft 95 on which is mounted a wringer roller 96 and which is disposed directly above the roller 59 and preferably formed of rubber or other similar material. As clearly illustrated in Figure 4, the endless belt 65 and the screens or pads 66 pass between the rollers 59 and 96.

Also, as best illustrated in Figure 4, the side walls of the portion of the tank 68 defining the chamber 71 are provided with upwardly opening vertical slots 97 which register with the slots of the standards 57 for accommodating the bearings 58 and the ends of the shaft 60.

As illustrated in Figure 13, a conventional type of snap switch 98 is mounted on the handle 31 adjacent its outer end and is connected to electrical conductors 99 and 100 which extend through one of the tubular legs 30 of said handle. The conductors 99 and 100 are connected to a suitable source of electric current 101 as illustrated in the diagrammatic circuit of Figure 14 and the conductor 99 has spaced portions thereof connected to the posts or terminals of the electric motor 52. Obviously, the conductors 99 and 100 will ordinarily be connected to a conventional electric plug adapted to be plugged into a conventional outlet socket of a domestic source of electric current but any other desired electrical source could be utilized. As illustrated in Figure 1, one side wall of the tank 68 may be recessed to provide a cavity 102 which extends into the chamber 69 for containing an electric resistance or heating element 103 which may, if desired, likewise be connected to the conductor 99 for heating the contents of the chamber 69 when the electric circuit of Figure 14 is energized or a separate connection to the electric source and separate switch may be utilized for the resistance element 103 or said element may be omitted together with the cavity 102.

A slightly modified form of the dolly is illustrated in Figure 9 and wherein the side beams 25a are apertured as seen at 104 to accommodate a transverse portion 105 of a wheel post 33a which is journaled therein and which likewise includes a lower depending portion 106 which terminates in an outturned stub-axial portion 107 for journaling a wheel 34a. It will also be readily apparent that a similar wheel post could be substituted for the wheel post 35 and wherein the lower depending portion thereof would be equipped with a swivel section to provide a caster.

Assuming that the machine 15 is assembled, as illustrated in Figures 1, 2 and 3 for use in washing a floor surface, as indicated at 108 in Figure 1, it will be readily apparent that when the dolly wheels 34 and 37 are disposed as illustrated in Figure 1 that they will support the machine 15 and with the endless floor washing unit 65, 66 out

of contact with the floor surface 100 and so that said machine 15 can be readily pushed along the surface 100 by pushing pressure exerted against the handle 31 in a direction toward the machine frame 16 When the machine 15 is thus pushed manually, the stops 42 through the link connection 40 between the dolly 24 and handle 31 will prevent said handle from being swung clockwise, as seen in Figure 1 so that the handle is illustrated in its fully raised position in this figure. When it is desired to utilize the machine 15 for washing the floor surface 100, the switch 96 is manually moved to a circuit closing position for energizing the electric motor 52 which will drive the shaft 45a and the drum or pulley 46 through the belt drive 50. At the same time, the handle 31 is pulled downwardly and rearwardly or counterclockwise as seen in Figure 1 to exert a pull on the flexible members 35 for moving the shaft 45a and drum 46 rearwardly with respect to the machine frame 16 for tensioning the two drive belts 56 and the belt 65 on the corner rollers or drums 46 and 53 so that the belts 56 and 65 will be driven in a clockwise direction, as seen in Figures 1 and 3, or so that the upper flights thereof will be moving from left to right and the lower flights from right to left. Likewise, the aforementioned counterclockwise movement of the handle 31 will exert a pull on the link 40 for rocking the dolly posts 33 and 35 counterclockwise on their pivots as seen in Figure 1 for elevating the wheels 34 and 37 out of contact with the floor surface 100 and so that the machine 15 will be supported on the bottom flight of the endless washing unit 65, 66. Accordingly, it will be readily apparent that the machine 15 will then be propelled along the floor surface 100 in a direction from left to right of Figure 1 and the operator by holding back on the handle 31 can cause the floor engaging endless element 65, 66 to slip relatively to said floor surface for mopping or washing it as the machine passes thereover. It will be readily obvious that prior to the operation of the machine 15 the chamber 69 thereof will have been filled with water or other deterging liquid through the filling neck 70 and which liquid will be discharged through the conduit 82 and from the ports 83 thereof onto the floor surface 100 directly in front of the bottom flight of the endless unit 65, 66 and so that said bottom flight may utilize this water or deterging liquid for washing the floor. As previously described, the rotary brush 73 will be adjusted so that it will be driven by its engagement with the endless unit 65, 66 and in the opposite direction thereto or counterclockwise, as seen in Figure 1, for brushing any loose dirt, trash or other debris from in front of the machine 15. The endless unit 65, 66 is adapted to be so constructed that it will pick up most of the water or deterging liquid from the floor surface leaving it in a well mopped or washed condition. The counterclockwise pull on the handle member 31, previously described, will also result in a pull being exerted thereby on the flexible member 90 which will cause the two bell cranks 88 to rock counterclockwise, as seen in Figure 1, for forcing the bearing blocks 93 downwardly in the slotted standards 57 to thereby force the shaft 95 and roller 96 downwardly toward the roller 59 so that the endless washing unit 65, 66 in passing between the rollers 59 and 96, will be wrung or squeezed for extracting the dirty water or deterging liquid therefrom. The dirty water or deterging liquid thus extracted by the wringer rollers 59 and 96 will be discharged by gravity downwardly through the open top 73 into the chamber 71 of the tank 68. The upstanding side walls 76 of the tank 68 will guide the endless unit 65, 66 and will also prevent any of the deterging liquid therefrom being discharged over the sides of the machine 15. The top wall 76a will provide a support for the belt 65 during its movement across the top part of the machine and from rear to front thereof while the tank bottom 74 will provide a support for the endless washing belt 75 during its movement from front to rear and along the bottom of the machine and, as seen in Figure 4, said bottom 74 is provided with stepped or recessed guide edge portions 109 for accommodating the endless driving belts 56. The intermediate, bottom idler pulley 64 will cooperate with the front and rear pulleys 53 and the tank bottom 74 to maintain the bottom flight of the surface engaging unit 65, 66 in substantially a horizontal plane and so that all portions thereof will be uniformly in engagement with the floor surface 100.

It will likewise be readily apparent that the dolly 24 and the brush 78 may be removed to permit removal of the unit 65, 66 and so that a sanding belt may be substituted therefor. Likewise, it will be readily obvious that suitable endless floor surface engaging element for use in polishing, waxing or oiling the floor surface 100 may be substituted for the unit 65, 66 and the compartment or chamber 69 may then be filled with a proper liquid for oiling, waxing or polishing the floor.

To render the machine 15 inoperative, it is merely necessary to manually operate the switch 98 after which the handle 31 can be swung upwardly or forwardly with respect to the machine for lowering the wheels 34 and 37 into engagement with the floor surface 100 and so that the machine may be pushed manually over said surface and with the remainder of the machine out of contact therewith. The rear caster wheels 37 will permit the machine 15 to be readily guided manually when being pushed by the operator.

Various modifications and changes are contemplated and may obviously be resorted to, without departing from the spirit or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. A machine of the character described comprising a machine frame, a dolly connected to said machine frame and provided with floor surface engaging wheels forming a wheeled support for the machine, a plurality of pulleys journaled in the machine frame, an endless floor surface engaging element trained over said pulleys and having a bottom stretch disposed below the machine frame and longitudinally thereof, driving means for one of said pulleys for driving said endless floor engaging element, a handle swingably connected to one end of said dolly, said dolly including posts each pivoted to a part of the dolly intermediate of its ends for vertical swinging movement, one of the surface engaging wheels being journaled on a lower end of each post, links pivotally connected to the opposite upper ends of the posts to cause the posts to swing in unison in vertical planes, and means connecting said handle and links whereby when the handle is swung in one direction said wheels will be moved to elevated positions above the level of the bottom stretch of the endless surface engaging element for supporting the ma-

chine on the said bottom stretch, said endless surface engaging element being adapted to propel the machine when driven with the bottom stretch in contact with a floor surface above which the wheels are disposed and the weight of the machine on the bottom stretch functioning to treat the surface in contact therewith as the machine is propelled thereover.

2. A machine as in claim 1, and a rotary sweeper brush demountably and adjustably supported by the machine frame and adapted to engage said surface and disposed forwardly of and in contact with said endless surface engaging element to be driven thereby in the opposite direction to said endless element for sweeping the surface ahead of the endless element.

3. A machine as in claim 1, a tank demountably supported by said machine frame and around which said endless surface engaging element is disposed, said tank having a closed chamber adapted to contain a floor washing liquid, said tank having a second chamber provided with an open top, and wringer means supported by the machine frame for engagement with the upper stretch of the endless surface engaging element for wringing said element for extracting the dirty washing liquid therefrom, said wringer means being disposed above and within the open top of said last mentioned chamber whereby the liquid extracted from said endless element will be discharged into said last mentioned tank chamber.

4. A machine as in claim 1, a tank demountably supported by said machine frame and around which said endless surface engaging element is disposed, said tank having a closed chamber adapted to contain a floor washing liquid, said tank having a second chamber provided with an open top, wringer means supported by the machine frame for engagement with the upper stretch of the endless surface engaging element for wringing said element for extracting the dirty

washing liquid therefrom, said wringer means being disposed above and within the open top of said last mentioned chamber whereby the liquid extracted from said endless element will be discharged into said last mentioned tank chamber, and means connecting said wringer to the handle whereby said wringer will be moved to an operative position when the handle is swung in a direction for elevating the surface engaging dolly wheels.

5. A machine as in claim 1, and means connecting one of said pulleys to said handle, said last mentioned pulley being slidably supported in the machine frame and displaceable therein for tensioning said endless surface engaging element by movement of the handle in a direction for elevating the dolly wheels.

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