Oct. 16, 1928. 1,687,998

E. F. WENDIG

MACHINE FOR FINISHING FLOORS

Filed Jan. 31, 1928 2 Sheets-Sheet 1

Fig. 2.

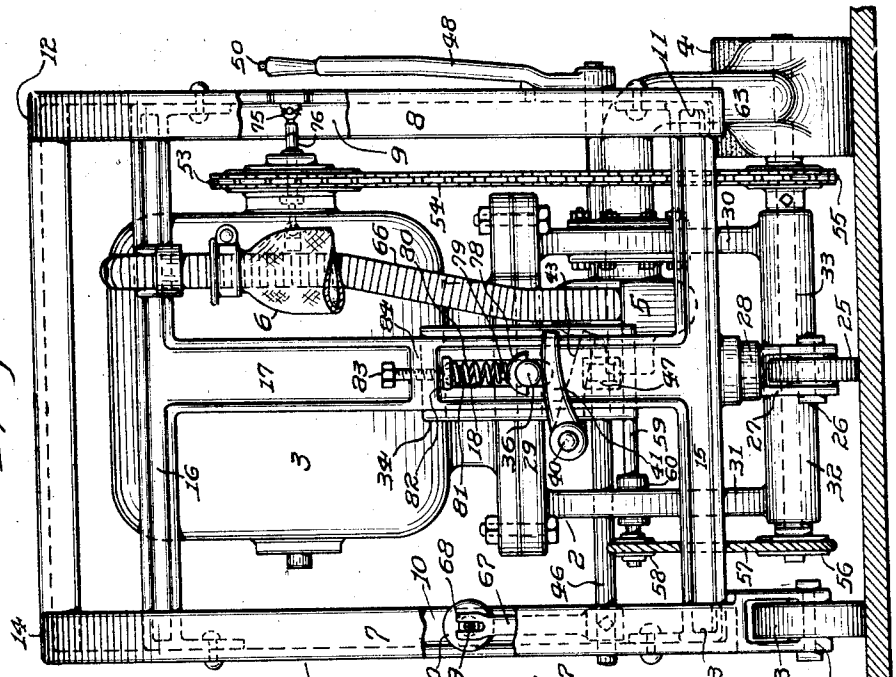
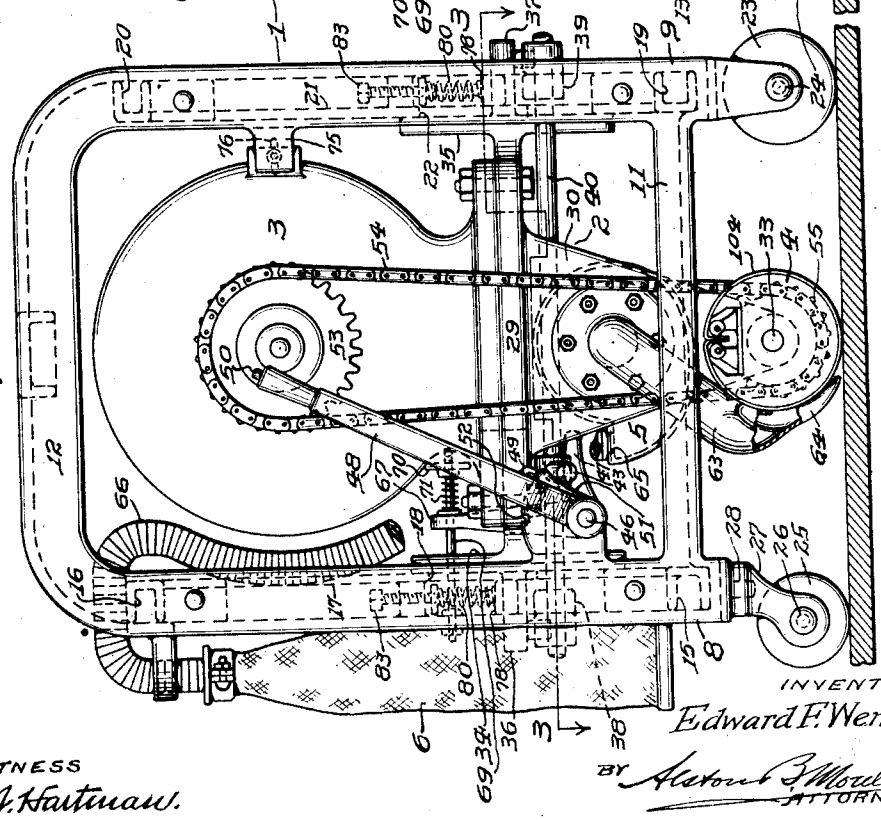


Fig. 1.



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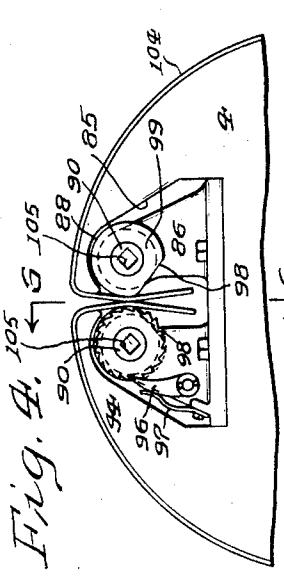


Fig. 4.

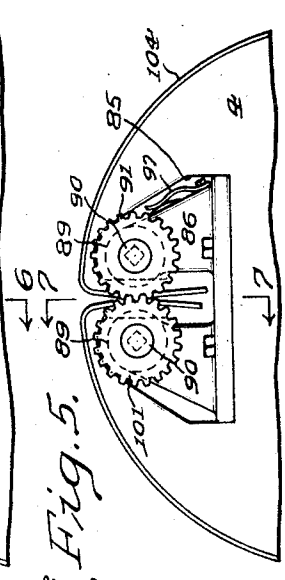


Fig. 5.

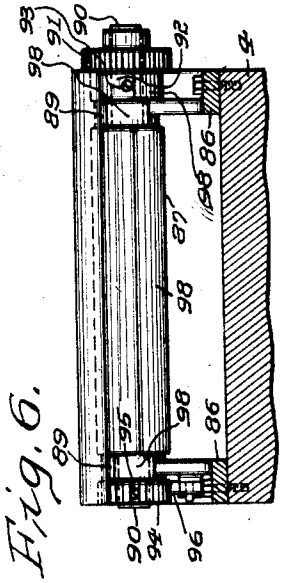


Fig. 6.

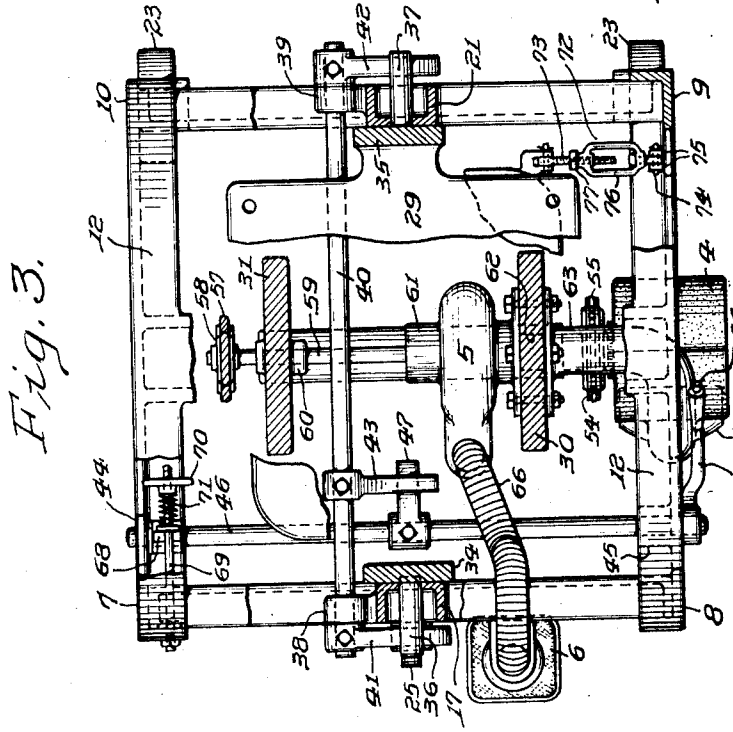


Fig. 3.

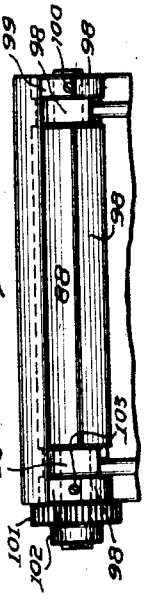


Fig. 7.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR FINISHING FLOORS.

Application filed January 31, 1928. Serial No. 250,773.

My invention relates to floor surfacing machines and more particularly to such machines wherein an abrasive cylindrical drum, power driven, and mounted in a carriage, but adapted to be brought into contact with the floor when in operation, is revolved upon a horizontal axis, and the machine as a whole may be pushed back and forth by the operator for abrading, smoothing and polishing the floor.

Heretofore such floor finishing machines have been either of heavy construction and so generally designed as to make it impossible to finish the floor close up to the baseboard of the walls of the room, or they have been of such light construction that the operator has been required to add some substantial part of his own weight thereto to hold the abrasive wheel or cylinder hard against the floor during the operation of the device. It is the object of my invention to provide a small floor finishing machine in which the abrasive drum and the motor for driving the same are mounted upon an inner platform or framework which is freely movable in a vertical direction within the main framework or carriage whereby the entire weight of the drum, the inner frame work, the motor and all of the parts supported on the framework may be imposed directly on the abrasive or polishing drum and through it to the floor along the line of contact of the drum with the floor.

A further object of my invention is to provide a means whereby the abrasive drum may be lifted from or lowered into contact with the floor by the movement of a single, hand-operated lever.

A further object of my invention is to provide the drum lifting and lowering mechanism with an adjustable yielding mechanism, partially balancing the weight of the motor, drum and motor frame whereby the pressure of the drum against the floor may be readily adjusted and varied to adapt the machine for working on floors of different materials or for different stages of the work on a given floor.

A further object of my invention is to provide the drum with an adjustment operable to slightly tilt the drum in a vertical plane coincident with the axis of the drum, thereby inclining the axis of the drum to correspond with slight deviations in the plane of different portions of the floor from a true horizontal.

A further object of my invention is to mount the horizontally disposed abrasive roller or drum so that a free end of it projects laterally from the carriage beyond any portion of the frame or carriage or parts carried thereby.

A further object of my invention is to provide a roller with improved means whereby sheets of abrasive paper or cloth may be tightly and smoothly wrapped around and secured smooth against the surface of the abrasive drum or roller.

Further objects of my invention will appear in the specification and claims below.

In the drawings forming a part of this specification and in which the same reference characters are employed throughout the various views to designate the same parts,

Fig. 1 is a side elevational view of my improved floor finishing machine on that side of the machine from which projects the abrasive roller or drum.

Fig. 2 is a rear elevational view of the machine shown in Fig. 1.

Fig. 3, in the main, is a horizontal cross-sectional view on the line 3—3 of Fig. 1, but certain parts are broken to clearly show constructions behind or beneath them.

Fig. 4 is an end elevational view of a portion of the abrasive drum showing my improved means for drawing the abrasive sheet tight around the drum and holding it in position.

Fig. 5 is a similar fragmentary view of the opposite end of the said drum.

Fig. 6 is a vertical cross-sectional view on the line 6—6 of Fig. 4.

Fig. 7 is a vertical cross-sectional view on the line 7—7 of Fig. 5.

My machine comprises, in the main, two parts, a framework or carriage 1 and an inner frame or platform 2 upon which is mounted an electric motor 3, the abrasive drum 4, the gearing between them and the exhaust fan 5 by means of which the dust from the abrasive wheel may be lifted and collected into a suitable dust collecting bag 6, preferably hung on the carriage 1 at the rear of the machine.

The outer framework or carriage 1 preferably comprises four vertical and corner columns or posts 7, 8, 9 and 10, the columns 7 and 8 being preferably at the rear end of the machine and the columns 9 and 10 at the front end of the machine. The posts or columns 8 and 9 are preferably connected by a web or bar 11 near the lower end of the said posts and at their top ends by a crossbar 12, which

may be somewhat arched, as shown in Fig. 1. On the other side of the machine, the columns 10 and 7 are similarly connected together by a web or bar 13 near their bottom ends and their top ends are connected by a similar crossbar 14. The posts or columns 7 and 8 are also connected near their bottom ends by a crossbar 15 and near their upper ends by a crossbar 16, said bars 15 and 16, being connected to and supporting a vertical guide web 17, the inner surface of which is preferably smooth and which, below the plane of the motor 3, is provided with a vertically elongated guideway or slot 18. On the opposite or front side of the machine the carriage is similarly provided with a similar lower crossbar 19, a similar upper crossbar 20 and a vertical guide web 21 having a similar vertically disposed elongated slot 22 in horizontal alinement with the guideway or slot 18 in the vertical web 17. Standing at the rear side of the machine then, the bars 15, 16 and 17, and the guideway 18 are on the right hand side of the machine and the bars 19, 20, 21 and the guideslot 22 are on the left hand side of the machine. Of course the terms right hand and left hand are merely relative, and are here employed to simplify the description of the mechanism as illustrated in the drawing. The lower ends of the two forward posts or columns 9 and 10 are provided each with a roller 23 mounted on fixed alined horizontal studs or shafts 24, the axes of which are substantially parallel to the axis of the abrasive roller 4. On the rear end of the machine, midway between the ends of the crossbar 15 is a castor roller 25 mounted on a horizontal stud 26 in a castor frame 27 which is mounted to turn on a vertical stud 28 secured to the underside of the crossbar 15. The inner frame 2 comprises a substantially rectangular platform 29, having a plane upper surface on which is mounted and supported the electric motor 3. Projecting downwardly from the underside of the platform 29 are two parallel webs 30 and 31 connected at their lower ends by a sleeve 32 providing a bearing for a shaft 33 upon one end of which the abrasive roller or drum 4 is rigidly mounted. On the rear and front sides of the platform 29 and forming a rigid part thereof are guide plates 34 and 35 having parallel vertical faces adapted respectively to bear smoothly against and slide upon the smooth inner sides of the vertical guide webs 17 and 21 respectively and from the substantial center of these guide plates outwardly project trunnions 36 and 37 respectively slidingly fitted within the guideway or slots 18 and 22 respectively and to project through said slots well beyond the outer faces of the vertical guide webs 17 and 21 respectively as clearly shown in Fig. 3.

Mounted in alined bearings 38 and 39 respectively on the vertical guide webs 17 and 21 respectively, is a cam shaft 40 provided at its ends respectively with two cams 41 and 42 extending laterally under the trunnions 36 and 37 respectively and this shaft 40 is also provided with a lever 43 rigidly secured to the shaft 40 and extending outwardly therefrom somewhat horizontally as clearly shown in Fig. 3.

The rear posts or columns 7 and 8 are provided each with one of a pair of alined bearings 44 and 45 respectively in which is mounted for rotation or oscillation a shaft 46. This shaft 46 is provided with a cam 47 extending substantially horizontally therefrom and its upper surface is the cam surface which is pressed against the underside of the lever 43 (see Figs. 1 and 3). This cam 47 is rigidly secured to the shaft 46.

The right hand end of the shaft 46 is provided with a handle 48 rigidly secured thereto and preferably extending upwardly just outside of the post or column 8 so as to be available for convenient manipulation of the right hand of the operator of the machine. This handle or lever 48 may be provided with a pawl 49 operable by a button 50 at the top of the lever to raise and lower the pawl 49 with respect to a segment 51 projecting forwardly from the post or column 8 close to the handle or lever 48 and provided with a suitable notch 52 adapted to be engaged by the pawl 49 when the lever is drawn rearwardly to substantially a vertical position. For the purpose of making clear the purpose and operation of this mechanism and referring to Figs. 1 and 3, and assuming the parts to be in the position shown in Fig. 1, I will here state that when the lever or handle 48 is pulled rearwardly to substantially a vertical position, the pawl 48 will fall into the notch 52 of the segment 50 and will be operative to hold the lever in that position when the hand of the operator is removed therefrom. In so turning to this position, the shaft 46 will be rotated, raising the free end of the cam 47 in engagement with the underside of the lever 43 thus turning the shaft 40 and with it the cams 41 and 42 respectively beneath the trunnions 36 and 37 and lifting the said trunnions 36 and 37 and with them the platform 28 and the parts carried thereby, and consequently lifting the abrasive roller or drum 4 upwardly out of contact with the floor to an inoperative position. To lower the drum to the floor the operator draws slightly rearwardly on the handle or lever 48, depresses the button 50 which lifts the pawl 49 out of the notch 52 and permits the operator then to allow the lever or handle 48 to swing forwardly under the weight of the parts supported on the cams 41 and 42 until the abrasive roller 4 shall again make contact with the floor.

The motor 3 is preferably provided with a driving wheel 53 which is illustrated as a

sprocket wheel cooperating with a sprocket chain 54 which passes around the underside of a sprocket wheel 55 rigidly mounted on the shaft 33 to drive the same. The outer end of the shaft 33, on the right hand side of the machine, is provided with the abrasive roller or drum 4 rigidly secured thereto so that this roller 4 is driven from the motor 3 through the sprockets 53 and 55 and sprocket chain 54 to abrade or finish the floor. The opposite end of the shaft 33 is provided with a pulley 56 connected by a belt 57 with a pulley 58 on a fan shaft 59, one end of which may be journaled in a bearing 60 in the web 31 and the other end of which is suitably journaled in the casing of the fan 61 which is preferably mounted and secured to the inner side of the web 30.

The exhaust fan 61 may be of any approved type wherein, by the rapid rotation of the blades, air is drawn into the center of the fan and expelled centrifugally from a point tangentially to the outer ends of the fan blades. Such an exhaust fan 61 is shown in Figs. 1 and 2 and the opening at the center thereof is in registration with an opening 62 through the web 30. On the opposite side of the web 30 is secured a pipe or conduit 63 which extends outwardly between the vertical courses of the sprocket chain 54 and then curves downwardly and to the rear terminating in a hood or head 64 close to the rear side of the abrasive wheel 4 and extending down close to the floor. From the discharge opening 65 of the fan 61 extends a flexible conduit 66 extending vertically up to and over the upper cross bar 16 and then downwardly where it is attached to the upper end of a dust collecting bag in any operative manner.

With the parts arranged and disposed in the manner above described it will be apparent that when the lever or handle 48 is in the position shown in Fig. 1, the entire weight of the motor 3, the inner frame 2 and the parts carried thereby, including the abrasive drum 4, the gearing between it and the motor, the fan and its connections will all be supported on the floor while only the weight of the outer frame or carriage, a relatively small fraction of the weight of the entire mechanism, will be supported on the rollers 23 and the castor 25. The pushing of the carriage 1 forwardly and backwardly will move the abrasive roller over the floor. The pressure of the abrasive roller upon the floor will be more than sufficient to thoroughly finish the floor.

I have, however, provided my machine with a further device or mechanism whereby different portions of the weight of the inner frame and the parts carried thereby may be counterbalanced so that the operator may vary and adjust the pressure between the abrasive roller and the floor for different operations and conditions. To this end I preferably provide the shaft 46 adjacent the journal 44 with an arm or lever 67, the outer end of which is preferably provided with a fork 68. This lever is preferably rigidly secured to the shaft 46 to rotate therewith. Passing through or between the arms of the fork 68 I provide a screwthreaded stud 69 which may be rigidly secured to the post or column 7 in any suitable manner to project horizontally forwardly therefrom. Over the free end of the screw or stud 49 is threaded a hand wheel or nut 70 between which and the fork and around the screw or stud is a spiral compression spring. When the hand lever 48 is released so as to permit the abrasive roller or drum 4 to rest on the floor, the free end of the forked arm or lever 67 will bear against the adjacent end of the spiral spring 71 and compress it between the free end of the lever and the hand wheel. By adjusting the position of the nut or hand wheel 70 on the screw any desired part of the weight of the inner frame 2 and the parts carried thereby may be balanced or counterbalanced by the spring 71, and the abrasive drum may be made to bear on the floor with any desired pressure up to that produced by the entire weight of the inner frame and parts carried thereby.

It is to be observed that the platform 29 is supported on the cams 41 and 42 by the trunnions 36 and 37 resting thereon and that the guide plates 34 and 35 steady the platform between the guide webs 17 and 21 but there is nothing in the construction heretofore described to prevent its platform and the parts carried thereby from rotating on the trunnions 36 and 37 as an axis so that when looking toward the machine from the rear thereof as in Fig. 2, the entire inner frame might rotate about the trunnions 36 and 37 and swing the abrasive roller or drum 4 upwardy from the floor. That would, of course, be contrary to the desired purpose, operation, and function of the device. I therefore provide an adjustable connection 72 between the motor 3 and the outer frame 1, comprising a screwthreaded rod 73 hingedly connected to the motor casing to swing on a horizontal axis about said pivot and an alined stud rod 74 similarly hingedly connected to a lug or projection 75 on the pillar or post 9 as shown in Fig. 1 and having a turnbuckle 76 swiveled thereon, threaded over the rod 73, and clamped in any desired position by a jamb nut 77. Thus by turning the turnbuckle 76 the whole inner frame and the parts carried thereby, may be swung about the horizontal axis of the trunnions to bring the operative portion of the abrasive roller 4 parallel to the floor to be finished thereby. This adjustment 72 also provides a means whereby the abrasive roller 4 may

be tilted slightly in a plane normal to the floor and coincident with the axis of the abrasive roller when there are portions of the floor which are not strictly in a horizontal plane and which if the device were not so adjusted would be grooved by the outer edge of the abrasive roller when the machine is passed over such an uneven surface or slightly inclined surface.

In order to hold the trunnions 36 and 37 at all times firmly against the upper surfaces of the cams 41 and 42 during the operation of the device, and particularly when a part of the weight of the inner frame and the parts carried thereby are counterbalanced or partially balanced by the spiral compression spring 71, I preferably provide each of the trunnions with a saddle 78, the underside of which rests upon the trunnions and the upper side of which is provided with a lug 79 which projects upwardly into the lower end of a coiled spring 80. The upper end of the spring fits over a lug 81 of a circular cap 82 rotatably fitting against the lower end of an adjusting screw 83 passing through a horizontal web 84 on the face of the vertical guide webs 17 and 21 respectively. By adjusting the position of the screw 83, the spring between it and the saddle 78 may be compressed to hold the trunnions fixedly but yieldingly against the upper surfaces of the lifting cams 41 and 42.

In order that the sandpaper or abrasive cloth may be wrapped around the drum 4 and held there firmly during the operation of the device, I provide the drum 4 with a mechanism shown particularly in Figs. 4, 5 and 6. The drum 4 is preferably provided with an undercut channel 85 in the circular face thereof, providing a space within which may be mounted a pair of brackets 86 in each of which are journaled two rollers 87 and 88. The cylindrical heads 89 of the brackets 86 are preferably slightly smaller in diameter than the rollers 87 and 88. The brackets 86 may be securely bolted to the flat bottom of the undercut channel 85. Between the pair of brackets in which a roller 86 or 87 is mounted, the diameter of the roller is slightly larger than the diameter of the heads of the bracket. At the ends 90 of this central portion, the diameter of the rollers is reduced to fit the journal openings in the heads of the bracket. Outside of the brackets the reduced diameter of the roller 87 is preferably provided on one side with a gear 91 having a hub 92 of the same diameter as the roller 87 and rigidly secured thereto in any suitable manner, as by a set screw 93. The other end of the roller 87 is provided with a ratchet 94 instead of being provided with a gear 91. This ratchet 94 may be secured to the reduced end of the roller 87 by a set screw 95. Pivoted upon the bracket 86 adjacent the ratchet 94 is a pawl 96, the free end of which is yieldably held against the surface of the ratchet by a spring 97. The roller 87 is preferably provided with a flat surface 98 as is also the hub 92 of the gear 91, and the heads 89 of the brackets 86 are similarly provided with a flattened portion 98 disposed in a vertical or radial plane.

The roller 88 is like the roller 87 except that the ratchet 94 may be omitted and replaced by a sleeve 99 on one end of the same general diameter as that of the rollers 87 or 88 and secured thereto by a set screw 100 and the other end of the roller 88 is provided with a gear wheel 101 to mesh with the gear 91 and with a roller hub 102 secured to the reduced end of the shaft by a set screw 103. The roller 88, including the sleeve 99 and the hub 101 are provided with the same kind of a flat surface 98 extending longitudinally thereof, as are the corresponding parts of the roller 87 and the heads 89 in which the roller 88 is journaled are also similarly provided with like flat surfaces 98 but disposed in a vertical or radial plane parallel to the corresponding surfaces in the heads in which the roller 87 is journaled.

To secure the sheet of abrasive paper 104 to the drum 4, the sheet of paper of the width of the drum is wrapped around it and the ends are tucked in between the rollers 87 and 88 while the flattened portions 98 of the two rollers are parallel and substantially coincident with the flat surface on the heads 89. The outer end of the roller 87 may be provided with a polygonal hole 105 as shown in Fig. 4. When a wrench, having an end the cross-section of which fits into the hole 105, is inserted therein, the roller 87 may be given a turn in a clockwise direction (as viewed from the position shown in Fig. 4) and that quickly brings the circular portion of the rollers 87 and 88, including the sleeve 99 and of the hubs 92 and 102 closer to each other in the planes of the axes of the rollers than the thickness of the paper inserted therebetween, whereupon the paper will be pinched between the rollers. Now a further rotation of the rollers 87 and 88 draws the ends of the sheets inwardly, applying a longitudinal tension to the sheet 104 of abrasive until it is drawn tight and smoothly against the outer surface of the drum 4. When the paper has thus been stretched tight enough, it is merely necessary to remove the wrench from the hole 105 and the pawl 96 will hold the ratchet 94 and consequently the rollers 87 and 88 from rotating backward and releasing the paper 104 until it is desired to substitute a new abrasive surface.

If desired, each roller may be provided with a wrench hole 105 for since the two rollers 87 and 88 are geared together at their inner ends they will be rotated together by

turning either. Such slight variations in details are fully within the aim and scope of my invention.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States is:

1. In a floor surfacing machine, the combination with an outer carriage-frame and supporting wheels therefor, of an inner frame mounted to slide freely vertically within said carriage, an abrasive roller mounted to rotate on a horizontal axis and a motor for driving the same, both mounted and supporting upon said inner frame, said abrasive roller projecting laterally beyond the sides of said carriage to a point beyond anything projecting from said frame and carriage, whereby the outer end of said abrasive roller may be brought close to the baseboard of the wall surrounding the floor.

2. In a floor finishing machine, the combination of an outer carriage and supporting wheels on which said carriage is self-supported on the floor in an upright position and is freely mobile on said floor, an inner frame vertically slidable within said carriage, an abrasive roller mounted on said inner frame to rotate on a horizontal axis, a motor also mounted upon and carried by said inner frame, whereby the entire weight of said inner frame and the parts mounted thereon is normally supported upon the floor through said abrasive roller when said roller is on the floor, a hand operable lever mounted on said carriage to raise and lower said frame and with it said roller from and to the floor and yielding adjustable means cooperating with said lever to adjust and vary the pressure of said abrasive roller on the floor.

3. In a floor finishing machine, the combination of an outer carriage and supporting wheels therefor, an inner frame vertically slidable within said carriage, an abrasive roller mounted on said inner frame to rotate on a horizontal axis and projecting laterally through said carriage, a motor also mounted upon and carried by said frame, whereby the entire weight of said inner frame and the parts mounted thereon is supported upon the floor through said abrasive roller when said roller is on the floor, a hand operable lever mounted on said carriage to raise and lower said frame and with it said roller from and to the floor and yielding adjustable means cooperating with said lever to adjust and vary the pressure of said abrasive roller on the floor.

4. In a floor finishing machine, the combination of a carriage having vertical guide webs on the front and rear ends thereof provided each with one of a pair of vertical elongated alined slots, an inner frame provided with a pair of alined trunnions vertically slidable in said slots, a rotatable shaft mounted in said carriage, a pair of cams on said shaft upon which said trunnions are respectively supported, means to rotate said shaft manually to rotate said cams and by them to raise and lower said trunnions, a motor and an abrasive drum driven thereby, and wholly supported on said inner frame, whereby the entire weight of said inner frame and the parts carried thereby may be imposed upon the surface of said abrasive roller in contact with the floor.

5. In a floor finishing machine, the combination of a carriage having vertical guide webs on the front and rear ends thereof provided each with one of a pair of vertical elongated alined slots, an inner frame provided with a pair of alined trunnions vertically slidable in said slots, a rotatable shaft mounted in said carriage parallel to the axis of said trunnions, a pair of cams on said shaft upon which said trunnions are respectively supported, means to rotate said shaft manually to rotate said cams and by them to raise and lower said trunnions, a motor and an abrasive drum driven thereby, and wholly supported on said inner frame, whereby the entire weight of said inner frame and the parts carried thereby may be imposed upon the surface of said abrasive roller in contact with the floor.

6. In a floor finishing machine, the combination of a carriage having vertical guide webs on the front and rear ends thereof provided each with one of a pair of vertical elongated alined slots, an inner frame provided with a pair of alined trunnions vertically slidable in said slots, a rotatable shaft mounted in said carriage, a pair of cams on said shaft upon which said trunnions are respectively supported, an arm on said shaft projecting laterally therefrom, a second shaft mounted in said carriage and having a cam in engagement with said arm, a handle on said second shaft for turning said shaft and changing the position of said first-mentioned shaft through said cam and arm, and spring means acting upon said second shaft in opposition to the weight of said inner frame and parts carried thereby to adjustably balance a part of the weight of said inner frame and the parts carried thereby.

7. In a floor finishing machine, the combination of a carriage having vertical guide webs on the front and rear ends thereof provided each with one of a pair of vertical elongated alined slots, an inner frame provided with a pair of alined trunnions vertically slidable in said slots, a rotatable shaft mounted in said carriage parallel to the axis of said trunnions, a pair of cams on said shaft upon which said trunnions are respectively supported, an arm on said shaft projecting laterally therefrom, a second shaft in said carriage and having a cam in engagement with said arm, a handle on said second shaft for

turning said shaft and changing the position of said first-mentioned shaft through said cam and arm, and spring means acting upon said second shaft in opposition to the weight of said inner frame and parts carried thereby to adjustably balance a part of the weight of said inner frame and the parts carried thereby.

8. In a floor finishing machine, the combination of an outer frame provided with rollers and comprising a carriage, an inner frame, a motor mounted thereon, an abrasive wheel mounted on said inner frame and driven by said motor and rotatable on a horizontal axis, the free end of said roller projecting laterally from said carriage and mounted upon said inner frame, said inner frame being provided on the front and rear ends thereof with a pair of alined trunnions, said carriage being provided with alined slots into which said trunnions project and in which they may slide vertically, a cam shaft mounted in said carriage and having cams on the ends thereof upon which said trunnions may be supported, lifted and lowered, and a lever mounted on said carriage and operable to turn said shaft to cause said cams to raise and lower said trunnions and with them the inner frame and the parts carried thereby, and means to rotate said inner frame on said trunnions as an axis to adjust the inclination of the axis of said abrasive roller in a vertical plane.

9. In a floor surfacing machine, the combination of an outer frame provided with rollers and comprising a carriage, an inner frame, a motor mounted thereon, an abrasive wheel mounted on said inner frame and driven by said motor and rotatable on a horizontal axis, the free end of said roller projecting laterally from said carriage and mounted upon said inner frame, said inner frame being provided on the front and rear ends thereof with a pair of alined trunnions, said carriage being provided with alined slots into which said trunnions project and in which they may slide vertically, a cam shaft mounted in said carriage parallel to the axis of said trunnions and having cams on the ends thereof upon which said trunnions may be supported, lifted and lowered, and a lever mounted on said carriage and operable to turn said shaft to cause said cams to raise and lower said trunnions and with them the inner frame and the parts carried thereby, and means to rotate said inner frame on said trunnions as an axis to adjust the inclination of the axis of said abrasive roller in a vertical plane.

In witness whereof, I have hereunto set my hand this 30th day of January, 1928.

EDWARD F. WENDIG.