

Sept. 21, 1937.

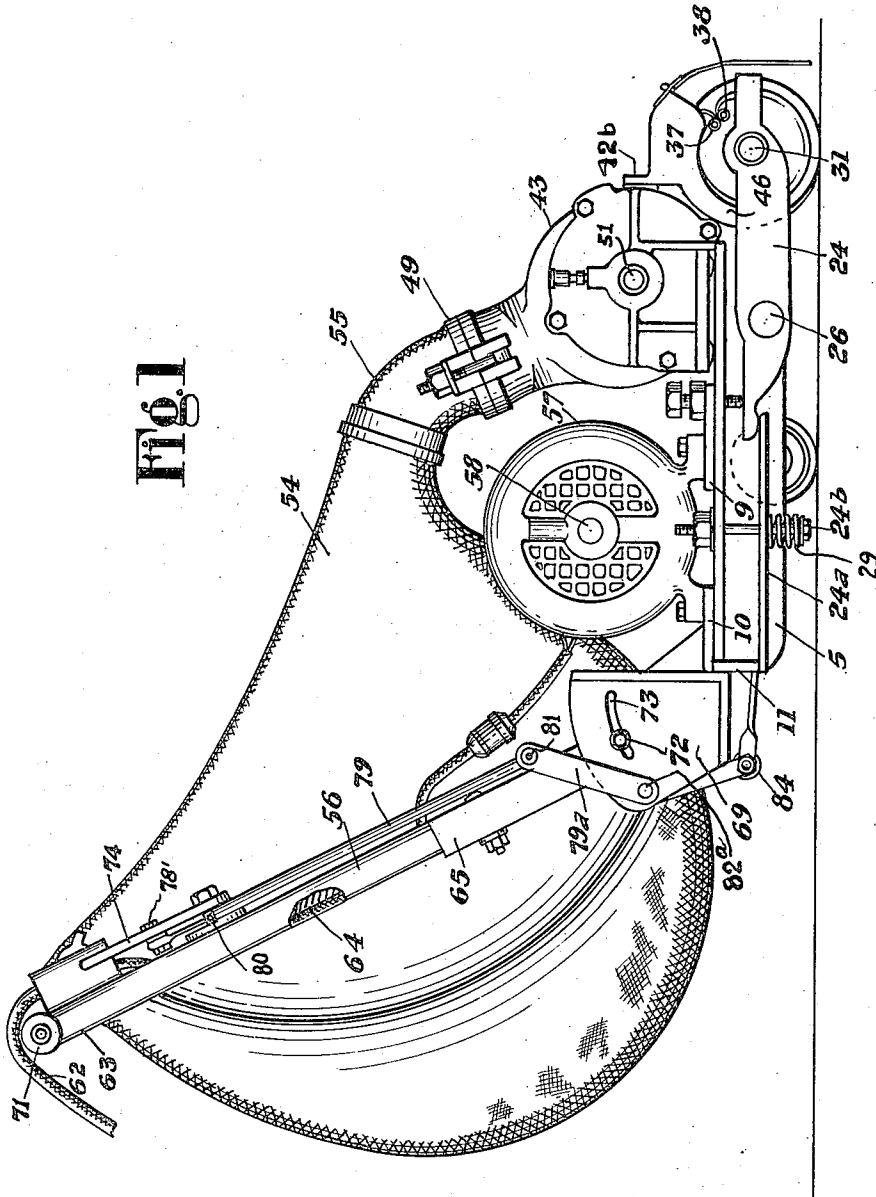
C. R. MAPPS

2,093,779

COMBINED FLOOR FINISHER AND POLISHER MACHINE

Filed Sept. 26, 1933

5 Sheets-Sheet 1



INVENTOR.

*Charles R. Mapps*

Sept. 21, 1937.

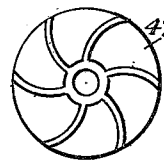
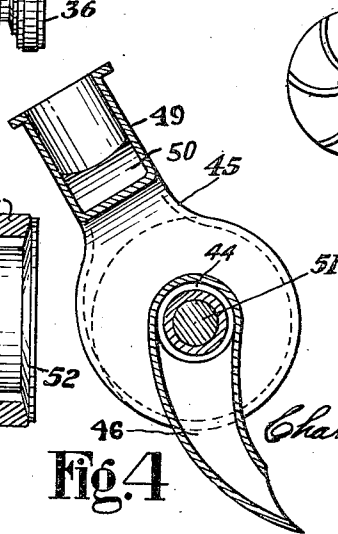
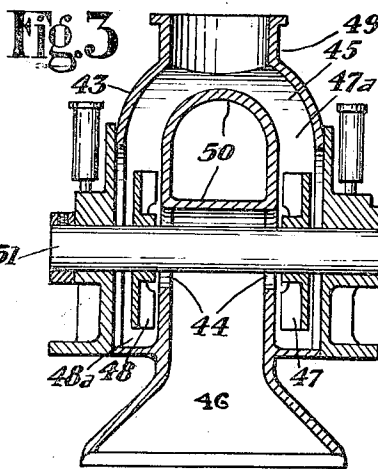
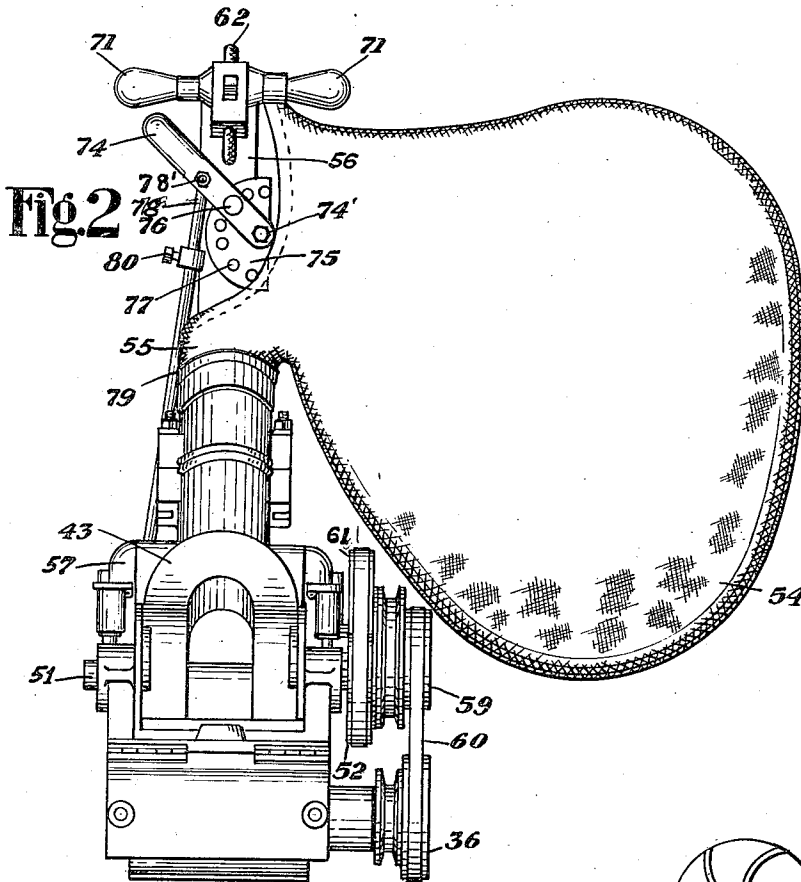
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COMBINED FLOOR FINISHER AND POLISHER MACHINE

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5 Sheets-Sheet 2



INVENTOR.

*Charles R. Mapps*

Fig. 4

Fig. 5

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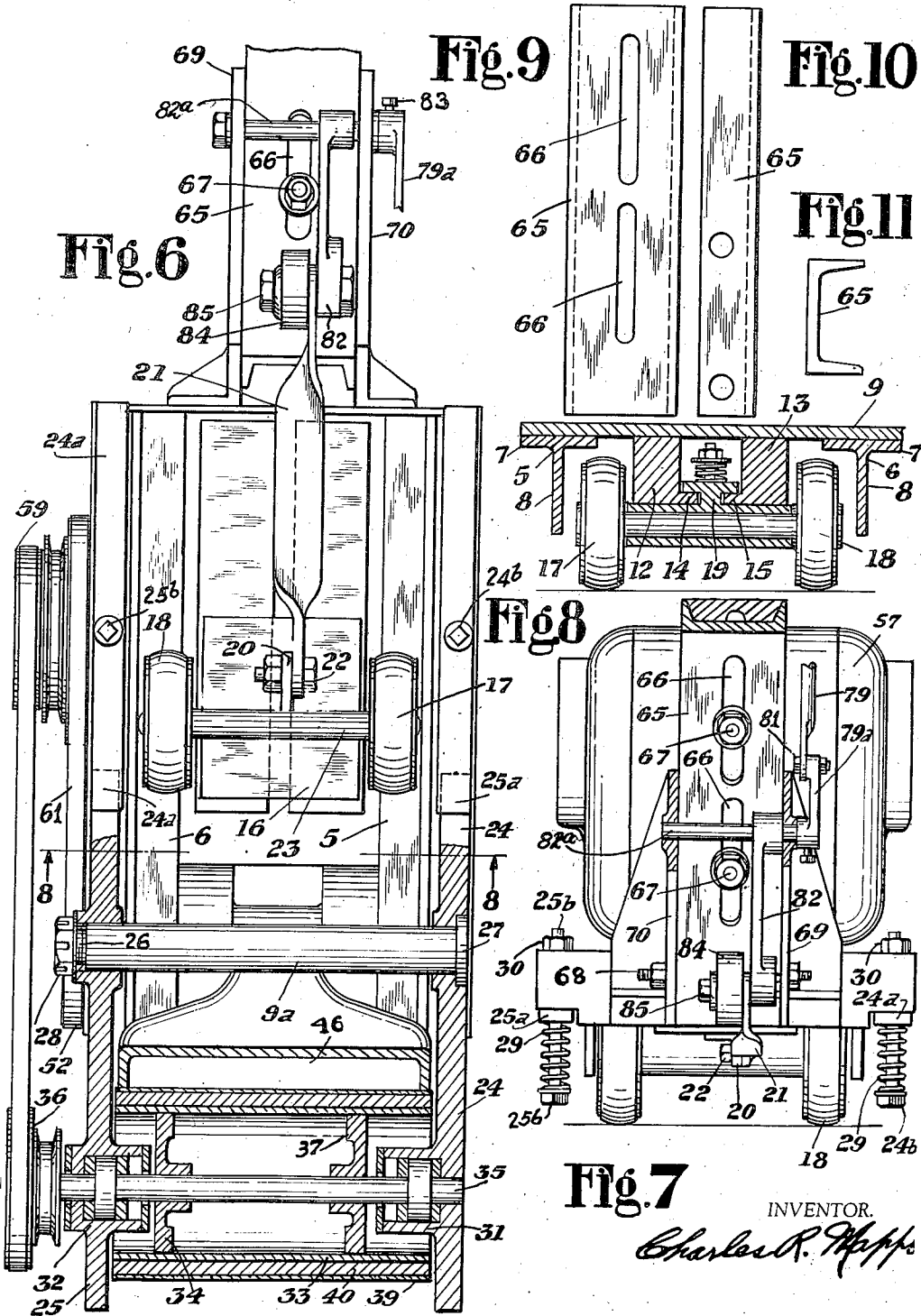
C. R. MAPPS

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COMBINED FLOOR FINISHER AND POLISHER MACHINE

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5 Sheets-Sheet 3



**Fig. 7**  
INVENTOR.  
*Charles R. Mapps*

Sept. 21, 1937.

C. R. MAPPS

2,093,779

COMBINED FLOOR FINISHER AND POLISHER MACHINE

Filed Sept. 26, 1933

5 Sheets-Sheet 4

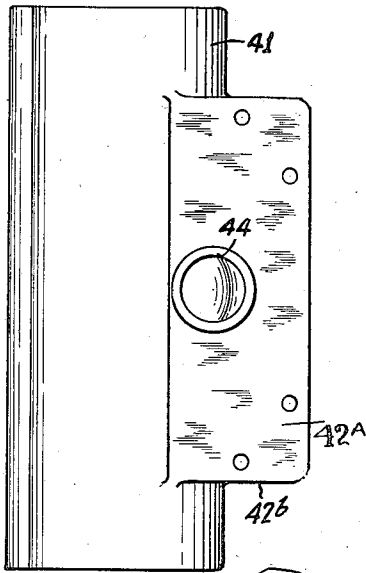


Fig. 14

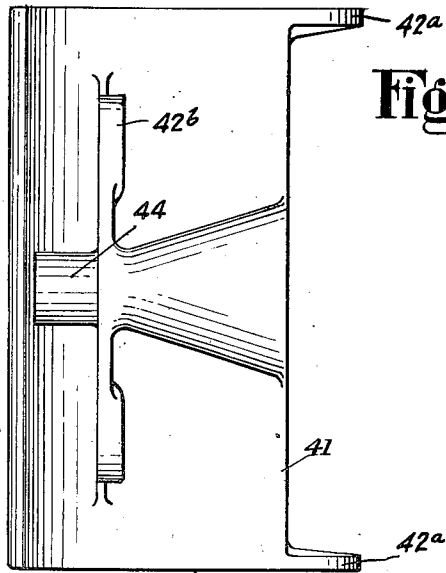


Fig. 13

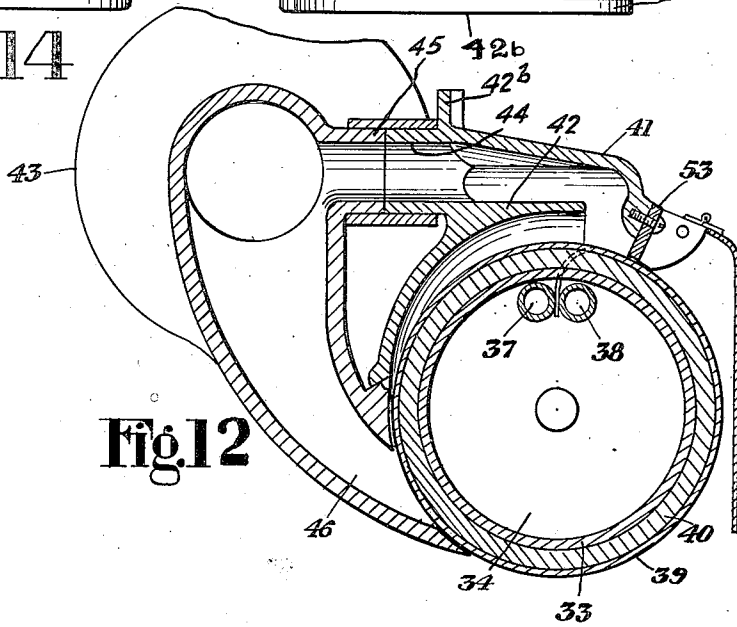


Fig. 12

INVENTOR.

*Charles R. Mapps*

Sept. 21, 1937.

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2,093,779

COMBINED FLOOR FINISHER AND POLISHER MACHINE

Filed Sept. 26, 1933

5 Sheets-Sheet 5

Fig.17

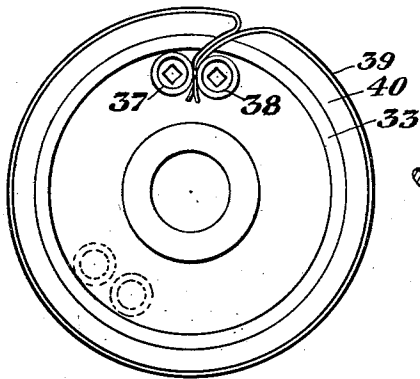


Fig.16

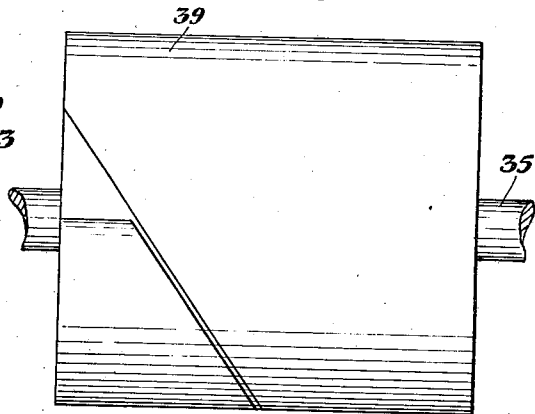


Fig.15

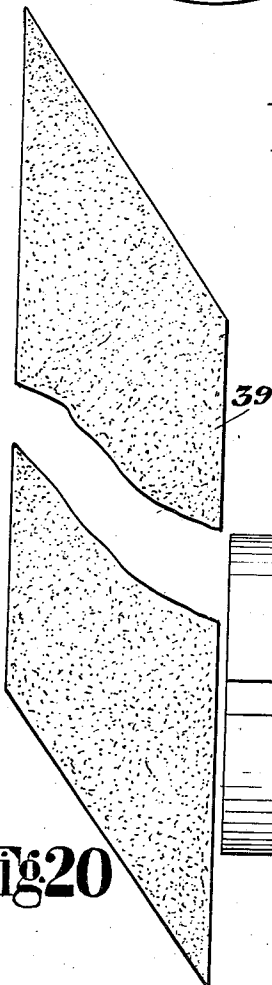
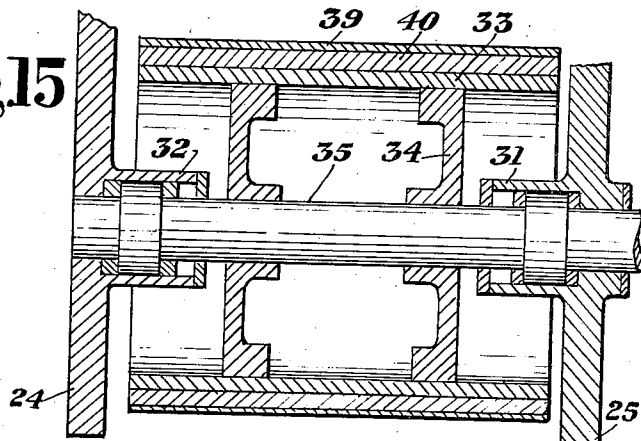


Fig.20

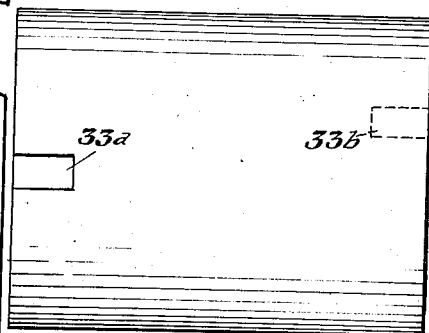


Fig.19

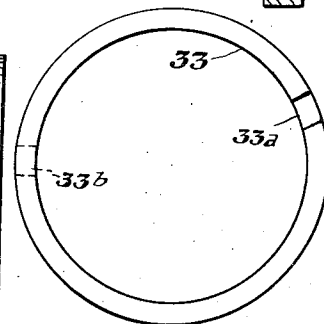


Fig.18

INVENTOR.

*Charles R. Mapps*

# UNITED STATES PATENT OFFICE

2,093,779

## COMBINED FLOOR FINISHER AND POLISHER MACHINE

Charles R. Mapps, Cranford, N. J.

Application September 26, 1933, Serial No. 690,991

5 Claims. (Cl. 51-176)

This invention relates to an improved floor polishing and sanding machine, and its leading object is to provide a power driven machine, which will sandpaper a floor surface, so as to produce a uniform finish, and which will remove all waste from the immediate zone of action, and from the working face of the rotating sandpaper drum, so that continued efficient operation with improved results can be obtained.

Another object of the invention is the provision of a machine of this general character with a double suction fan, operated by a single motor, and to provide a dirt receiving bag of greatly enlarged capacity, which is connected to the outlet of the suction fan, so that the bag will not interfere with the walking and other movements of the operator.

A further object of the invention is to mount the double suction fan forwardly of the wheeled frame of the machine, and to provide an intake for the double fan, which extends to a point adjacent the floor line or base of the sandpaper drum, and also over the drum, and has a wiping connection supported over the drum, so that waste clinging to the surface of the sandpaper drum will be detached and carried into the fan housings to be disposed of into the porous bag.

A still further object of the invention is the provision of a machine of this general character, with a carriage equipped with rear ground wheels, slidably mounted under the frame of the machine, and shiftable forwardly or rearwardly to permit the operator to vary the pressure upon the sanding drum, means being also provided for enabling the operator to shift the carriage, by manipulating a hand lever mounted on the handle of the machine.

A still further object of the invention is the provision of a frame for the machine, consisting of main frame members formed of T-shaped steel bars, and cross bars of L-shaped or angle form, which are welded thereto, to provide a frame which cannot be broken if the entire machine is dropped, in shifting it from job to job, or floor to floor.

A still further object of the invention is the provision of a machine wherein the sanding drum is carried by side levers, pivoted to the sides of the main frame, upon a shaft which is held in place by an end nut or retaining element, all assembled so that upon the withdrawal of the shaft the drum can be entirely removed.

A still further object of the invention is to provide a sanding drum, on which the sandpaper is wound helically, and held in place by clamping

jaws, all so arranged that a continuous cylindrical surface, almost devoid of irregularities is provided, which will produce a uniform sanded finish on treated floors.

A still further object of the invention is the provision of a handle which is adjustable relative to the frame of the machine, to accommodate operators of different heights, and to support the handle in various angular positions, to permit the operator to work the machine in open floors and in confined areas, to the best of advantage.

A still further object of the invention is the provision of a machine, wherein the sanding drum is mounted for rotation in self aligning bearings upon side levers pivoted in place on the sides of the frame, and held against the floor surface by means of flat leaf or cantilever springs, the tension of which is adjustable by means of screw threaded rods, equipped with coil springs bearing on the cantilever leaf springs.

With the above and other objects in view, the invention consists in certain new and useful constructions, combinations, and arrangements of parts, clearly described in the following specification, and fully illustrated in the accompanying drawings, in which:—

Fig. 1 is a side elevation of the improved machine.

Fig. 2 is a front end view thereof.

Fig. 3 is a vertical sectional view through the double fan.

Fig. 4 is another similar view thereof, taken from a different angle.

Fig. 5 is a detail side elevation of one of the fan rotors.

Fig. 6 is a bottom plan view, with the handle broken away.

Fig. 7 is a detail rear elevation, with the handle broken away.

Fig. 8 is a detail transverse sectional view, taken on line 8—8 of Fig. 6.

Fig. 9 is a plan view of a handle coupling.

Fig. 10 is a side view thereof.

Fig. 11 is an end view thereof.

Fig. 12 is a vertical sectional view through the fan intake, removed from the fan, showing the sanding drum.

Fig. 13 is a top plan view of the upper fan intake.

Fig. 14 is a rear end view thereof.

Fig. 15 is a horizontal sectional view through the sanding drum.

Fig. 16 is a top plan view of the sanding drum.

Fig. 17 is an end view thereof.

Fig. 18 is an end view of the cylindrical wall of the sanding drum.

Fig. 19 is a plan view thereof.

Fig. 20 is a plan view, broken away, of the sandpaper sheet.

Referring to the accompanying drawings, illustrating the practical development of the invention, 5 designates one of the T-shaped side bars of the main frame, and 6 the companion T-shaped side bar thereof. These bars are so arranged that the cross bar element 7 of each bar is disposed horizontally, and the stem element 8, is disposed vertically. These frame side bars are rigidly united to each other by means of the cross bars 9 and 10, which are welded or otherwise united thereto, and a tubular rod 9a welded near its ends to the side bars. The rectangular frame 11 thus constructed is further provided with parallel guide blocks 12 and 13, secured by welding or otherwise to the underside of the frame, and providing laterally spaced and longitudinally extending guideways 14 and 15.

The carriage plate or bar 16 of the rear truck wheels 17 and 18, is equipped with a T-shaped runner or gib 19, which has a sliding fit on the guideways 14 and 15. This plate is equipped with a depending lug 20, to which the forward end of the twisted metal link bar 21 is pivoted at 22. The wheels 17 and 18 are mounted to rotate in ball bearings arranged on the ends of the axle 23, which is fixed to the truck carriage plate 16, by welding or otherwise.

Against one side bar 5 the drum carrying lever 24 is arranged, and against the other side bar 6 the drum carrying lever 25 is arranged. These side bars are connected to each other by means of the cross pivot shaft 26, which extends through the vertical stem elements 8, or flanges, of the side bars 5 and 6, and the hollow rod 9a. One end of this pivot shaft is equipped with a head 27, which is nested in a recess formed in the lever 24, and the other end of the shaft is equipped with a clamping nut and washer 28, which when threaded in place will hold the shaft 45 and two levers for free pivotal movement against the outsides of the frame 11.

The rear ends of the levers 24 and 25 are engaged by the forward ends of the cantilever leaf springs 24a and 25a, respectively, which are held in place by the screw bolts 24b and 25b respectively. These bolts extend through the horizontal flanges of the side bars 5 and 6, and each is equipped with a coil compression spring 29, and a nut 30, adjustable thereon to vary the tension of the compression spring and the cantilever leaf spring engaged.

The lever 24 is equipped or formed with a large self aligning bearing hub 31 near its forward end, and the lever 25 is equipped or provided with a similar bearing hub 32. The sandpaper carrying drum includes the cylindrical steel tube or casting 33, and the core inserts 34, and through these core inserts the shaft 35 extends, to have free turning and self aligning bearing in the hubs 31 and 32. One end of this shaft is equipped with a two or multiple speed pulley 36. The steel tube or shell 33 of the sanding drum is formed with a slot 33a or 33b in each end thereof, and opposite each other on the opposite ends of the drum, and in line with this slot a pair of parallel clamping rod jaws 37 and 38 are mounted in a core insert 34, so as to receive the helical end of the sandpaper sheet 39, which is wrapped helically around the sponge rubber or resilient covering sheath

40 of the steel tube. This sheet is cut along diagonal side lines or edges, as shown in Fig. 20, so that it can be wrapped on the rubber covered drum and its side edges will be flush with the ends of the drum, and its helically cut edges will lie contiguous to each other. By this arrangement an almost unbroken cylindrical sanding surface is provided on the rubber covered drum. The tapering or helically cut edges of the sand paper sheet are extended in gradual sloping lines through the end slots 33a and 33b, so that the stock of the paper will not be subjected to a sharp breaking strain, and the sandpaper sheet will remain in place for a long working period, without breaking off.

The suction intake for the fan assembly or unit, includes the upper intake member 41, which is formed with a curved passage forming wall 42, which is disposed opposite to the rear side portion of the sanding drum, and which is connected by the flange 42b with the housing 43 of the fan unit. The curved suction passage forming wall 42 extends the full width of the fan and includes an end guard flange 42a for each end of the member, which lies close to but not in contact with the end of the drum.

This intake member 41 has an outlet 44 which discharges into the inlet 45 of the fan housing 43. A second intake member 45 is provided, which flares downwardly and is formed on the fan housing 43, so that its downwardly and forwardly curved lower end will lie adjacent to the upwardly moving rear surface of the sanding drum. This fanned or flared lower suction intake 46 discharges centrally into the fan housing 43, between the rotary fan elements 47 and 48, which work in the fan chambers 47a and 48a, joined to each other by the overhead U-shaped outlet 49, and by the axial and integral wall 50. A shaft 51 extends through the housing 43, and the fan rotors 47 and 48 are keyed thereto. One end of the shaft carries a pulley 52.

The overhead fan intake 41 carries a leather fibre wiping element 53, which soon develops a good working relation to the sanding drum, so that it tends to strip off floor waste which is picked up by the rotating drum, and to greatly improve the suction conveying action of the duplex fan unit, so that practically no floor waste is returned to the floor, and a continuously clean floor sanding action is obtained.

An unusually larger porous dirt holding bag 54 is connected by its inlet or neck 55 to the outlet 49, by any suitable retaining means. This bag extends rearwardly to one side of the handle unit 56.

The electric motor 57 is mounted on the frame 11, rearwardly of the duplex fan unit, immediately over the sliding carriage which carries the rear truck wheels 17 and 18. The shaft 58 of the motor carries a pulley 59 which is belted by the belt 60 to drive the pulley 36 of the sanding drum, and has driving connection by the belt 61 to drive the pulley 52 of the fan shaft. The cable 62, which encloses the lead wires of the motor, is looped through the handle 63, and nested in a longitudinal groove 64 thereof, formed on the rear side of the handle.

The lower end of the handle is equipped with a channel shaped coupling member 65, which is bolted through the slots 66, formed in the member 65 to the handle, by means of the tie bolts 67. By loosening these bolts the relation of the handle to the coupling member may be varied at will, to raise or lower the handle, to accommodate per-

sons of different heights. The lower end of the coupling channel 65 is pivoted by the shaft 68 between the vertical flanges 69 and 70, which are fixed to the end of the frame 11. The upper end of the handle is equipped with hand holds 71. The handle coupling or channel is adjustable to various angular positions, by means of the cross shaft 72, which extends through the arcuate slots 73 formed in the flanges 69 and 70, attached to the rear end of the frame 11.

On the upper end of the handle a short hand lever 74 is pivoted at 74' to the metal plate 75, which is bolted to the handle. This lever carries a clutch pin 76 which is adapted to spring into one of the recesses 77, arranged in an arcuate row on the plate 75. To the lever 74 the upper end of a rod 78 is pivoted. This rod is telescoped in a tube 79, and locked thereto by means of the set screw 80. The lower end of the tube 79 is connected by a pivot bolt 81, shown in Fig. 7 to a crank arm 79a which is fastened to the cross shaft 82a by a set screw 83. The cross shaft 82a also carries a crank arm 82 which is pivotally connected by the bolt 85 to the link 21, as shown in Figs. 6 and 7, and the bolt 85 carries a small ground wheel 84 shown particularly in Figs. 1 and 6.

By swinging the hand lever 74 on the handle, the carriage may be shifted on the frame 11, so that the longitudinal position of the rear wheels may be changed at will, by the operator, to vary the balancing effect of the motor against the sanding drum.

The disposition of the duplex fan unit immediately behind the rotary sandpaper drum, and the inlet connections for the single fan housing, which lead directly over and under the drum, provide a relatively short suction pull, which in practice is about six inches, so that the mechanical effort of the two fan rotors is applied to move the largest mass of floor waste, at the highest effective velocity, thereby producing, for the horse power energy utilized, the highest possible suction. By the construction embraced this suction is directed and controlled, so that as fast as the sandpaper drum is worked against the floor, the waste produced by this abrasive action is conveyed away, to maintain the working face of the sanding drum at the highest efficiency, and to produce, in combination, with the substantially continuous cylindrical working surface of the drum, a uniform finished surface upon the floor.

The pressure exerted by the rotating sanding drum upon the floor may be varied at will by adjusting the longitudinal disposition of the rear truck wheels, and little skill is required by the operator after such adjustment, to maintain a uniform action on the sanding drum. By applying manual pressure on the handle the sanding drum, in any of the pressure adjustments made by sliding the rear carriage for the truck wheels, may be relieved. By rolling the machine on the small rear wheel, the sanding drum may be kept out of engagement with the floor.

Due to the extra large bag that is provided, the resistance to discharge of the dirt laden air stream, which the fabric of the dirt bag ordinarily makes, is modified. The air will flow through the dirt bag at an increased rate, due to the fact that there are more pores in the larger bag to allow escape of the air, than in a smaller bag. The effect of this is to increase the velocity of the discharging air stream, and to increase the conveying capacity of the suction intake air stream.

The use of a large dirt bag is made possible by

the forward mounting of the duplex fan unit, and the general arrangement of the machine. This locates the outlet for the fan housing forwardly of the electrical motor, so that there is increased space for supporting the forward portion of the dirt bag, and due to this fact the rear portion of the dirt bag may be made larger. The faster the air leaves the bag the faster and the greater will be the capacity of the suction, in cleaning the floor and the sanding drum, as it works over the floor, and the use of the larger bag insures this greater capacity and faster action. The use of the two fan rotors in a common housing also increases the conveying capacity of the suction air stream, and the force with which the discharging air stream enters the larger bag.

Should it be necessary for an operator to change the sanding drum, all that is necessary is to remove the connecting nut on the end of the cross shaft, which pivotally supports the side levers on the frame, which carry the sanding drum. When it is necessary to remove the sandpaper sheet from the sanding drum, the round clamping jaws are turned, so that tension upon the paper sheet is relieved and the sandpaper sheet is then removed, and a new sheet placed in position. Any grade of sandpaper, or sandcloth may be used. Due to the gradual sloping bend of the end portions of the sandpaper, the attached sheet will remain indefinitely on the drum, without breaking, thus giving maximum wear and the best sanding action. Due to the helical mounting of the sandpaper sheet, no bumps are formed upon the working face of the sanding drum, so that it may operate more evenly over the floor, and leave a finish without spotty or uneven appearances.

By substituting a polishing brush for the sanding drum, the machine may be employed for polishing floors. The mounting of the drum carrying levers on the frame, permit the ready removal of the drum and its replacement by the polishing brush. This mounting enables the workman or contractor to remove a drum which has been mutilated by a nail or obstruction on a floor, without leaving the job on which he is working.

This practical advantage will result in the operator carrying an extra drum to every job, so that loss of time will be avoided, in the event that the sanding drum becomes useless, through ripping action of a nail, or other obstruction, without being required to take the heavy machine to a distant shop.

The working face is readily levelled, with respect to the face of the floor engaged by the sanding drum, by adjusting the spring bolts, and the bolt on the side of the motor drive belts is equipped with a stronger spring, than the other bolt, to compensate for the extra pull developed against this spring, because of the operation of the electrical motor.

The manual adjustment, at the head of the handle, for the truck wheels, enables the operator to work in the most confined spaces, with the handle disposed practically vertical, or in any angular position which good practice may suggest. The carriage is mounted so that the axle which carries the rear truck wheels will always be parallel to the axis of the drum, the machine being normally supported by the sanding drum and the rear wheels.

The electrical motor is located immediately over the rear wheels, so that the effect of their

longitudinal shifting, upon the pressure of the weight of the motor on the sanding drum, or polishing brush or head, will be most desirable.

Having described my invention, I claim as new:—

- 5 1. A floor surfacing machine, comprising a frame including longitudinal load bars and cross bars connected thereto, parallel guides carried by and located below the frame, said guides being  
10 spaced apart from each other and providing a longitudinal slot located midway of the sides of the frame, a runner slidably supported on said guides for adjustment in said slot, an axle carried by said runner, a pair of ground wheels on the  
15 ends of said axle, a link pivotally connected to the rear end of the runner, a bracket mounted on the rear end of the frame, a two armed lever pivoted on said bracket and having one of its arms pivotally connected with the link, a handle  
20 connected with the frame, a lever pivoted on the upper end of the handle, a rod pivotally connecting the handle lever to the other arm of the first-named lever, floor surfacing means carried by the forward end of the frame, and motor driven  
25 means for operating said surfacing means located on the frame rearwardly of the surfacing means and rearwardly of the axle to balance the weight of the forward end of the frame and the surfacing means, whereby the operator may shift the  
30 ground wheels longitudinally to effect the action of the weight of the motor driven means upon the pressure of the surfacing means, said ground wheels thus providing a shiftable rocking support for the frame and surfacing means thereof.
- 35 2. A floor surfacing machine consisting of a frame, a carriage slidably connected with the frame and including ground wheels, a handle pivoted on the frame and having relative upright adjustment thereon, floor surfacing means on the  
40 frame, a link connected with the carriage, a lever mounted on the upper end of the handle, a rock shaft on the lower end of the handle, a link connecting the rock shaft and the lever, and a connection between the carriage link and the rock

shaft, whereby the carriage may be shifted by swinging the lever on the handle.

3. A floor surfacing machine, consisting of a frame, a rotary sanding drum mounted on the forward end of the frame, a housing having a  
5 plurality of fan rotors working therein, and provided with a suction intake extending over the drum and another suction intake extending rearwardly of the drum and close to the floor line of the drum, and means confining the suction zone  
10 over the drum.

4. A floor surfacing machine, consisting of a frame, a rotary sanding drum mounted on the frame, a fan housing located adjacent to and above the sanding drum, a pair of fan rotors in  
15 the housing, a common shaft for said fan rotors, said housing having a divided intake which extends forwardly over the drum and rearwardly and downwardly of the drum, to remove waste from the upper surface of the drum and waste  
20 close to the floor line of the drum, and a wiper carried by the forward portion of the intake supported to extend close to the surface of the drum to confine the suctional pull of said intake to the rearward face and uppermost portion of the drum,  
25 and means carried by the frame for driving the shaft.

5. A floor surfacing machine consisting of a frame, floor surfacing means on the frame, a lever positioned against each side of the frame  
30 and extending forwardly thereof, a shaft extending through the frame and both levers and providing a pivotal support for the levers, a cantilever spring mounted on each side of the frame and having a bearing against the lever on the same  
35 side, a bolt extending thru the frame and through the cantilever spring means for adjusting the bolt, and a coil spring mounted on each bolt and engaging the frame at one end and the cantilever spring at the other end, whereby the tension of  
40 the cantilever spring may be varied, each lever having a drum supporting bearing on its forward end.

CHARLES R. MAPPS.