March 11, 1952 G. F. DWYER 2,588,707

FLOOR SANDER

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Fig. 1.

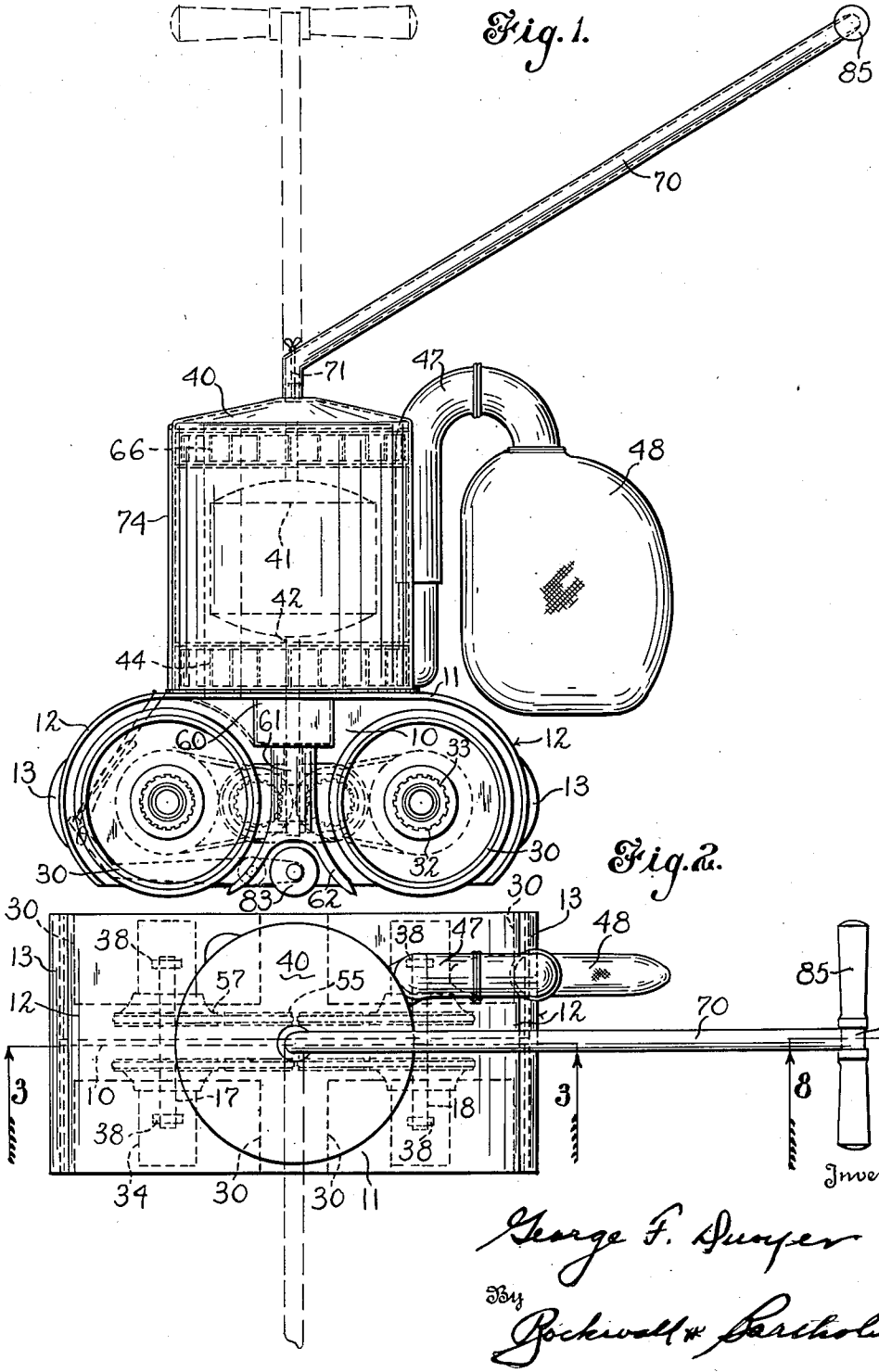


Fig. 2.

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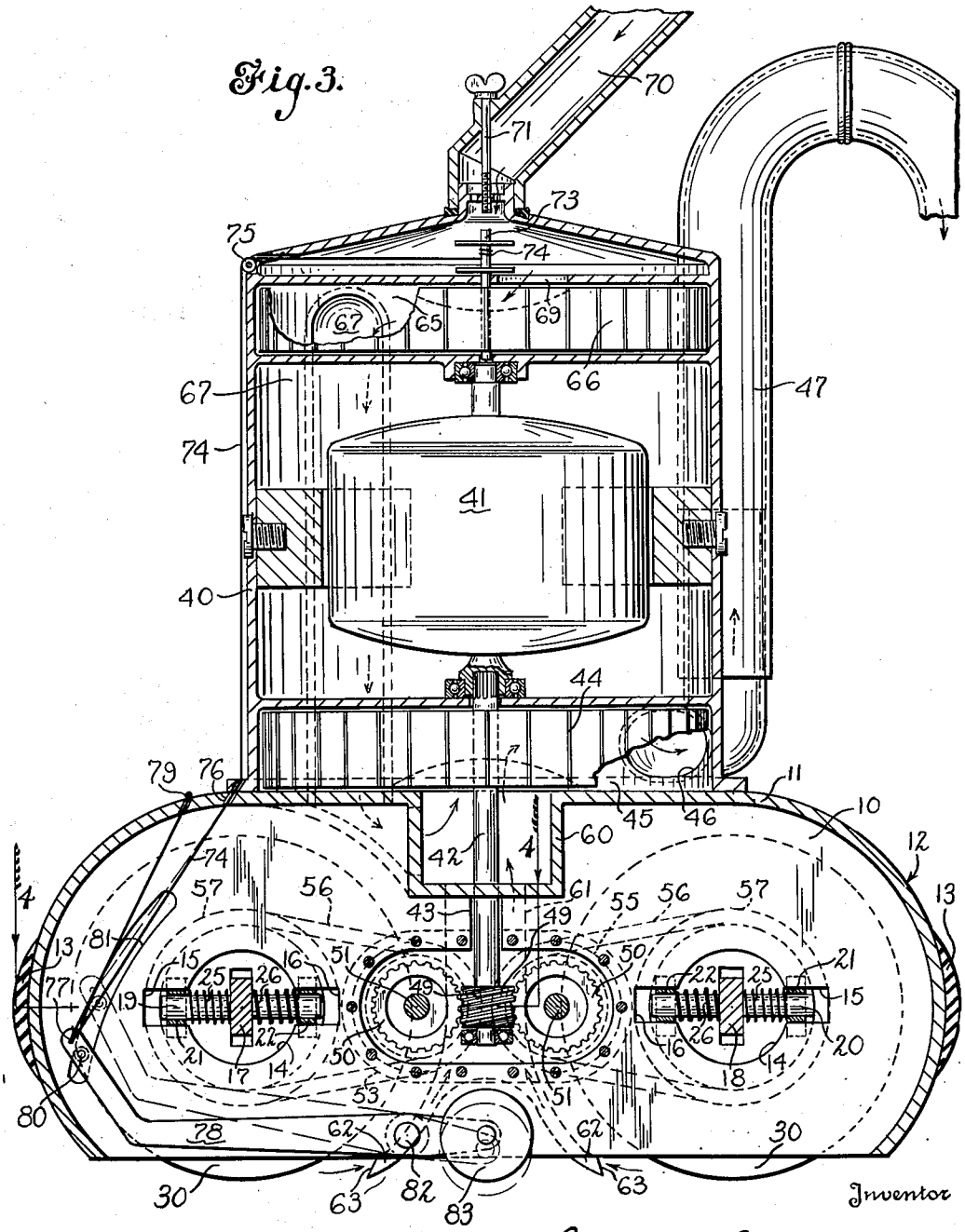
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FLOOR SANDER

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Fig. 3.



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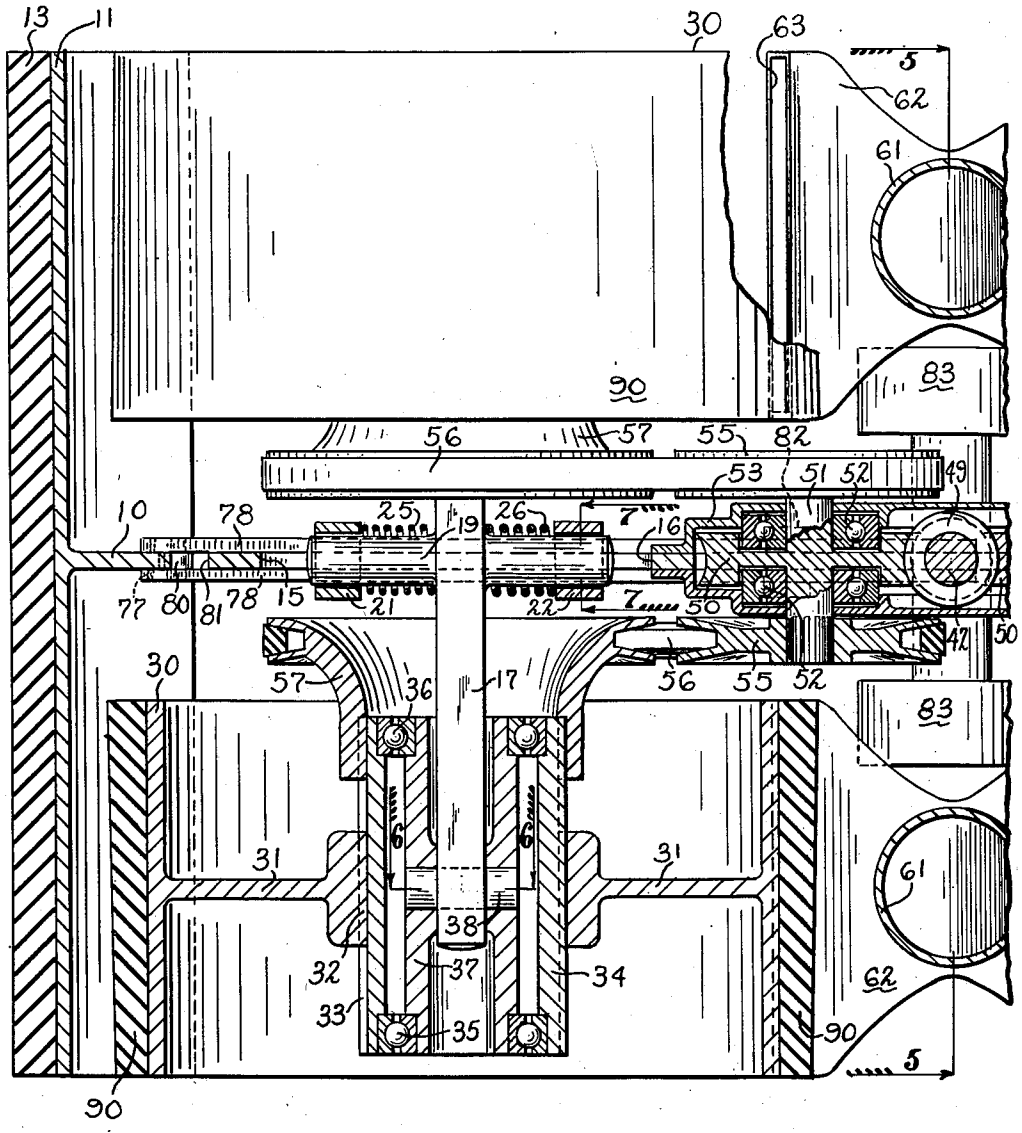
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FLOOR SANDER

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Fig. 4.



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FLOOR SANDER

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Fig. 5.

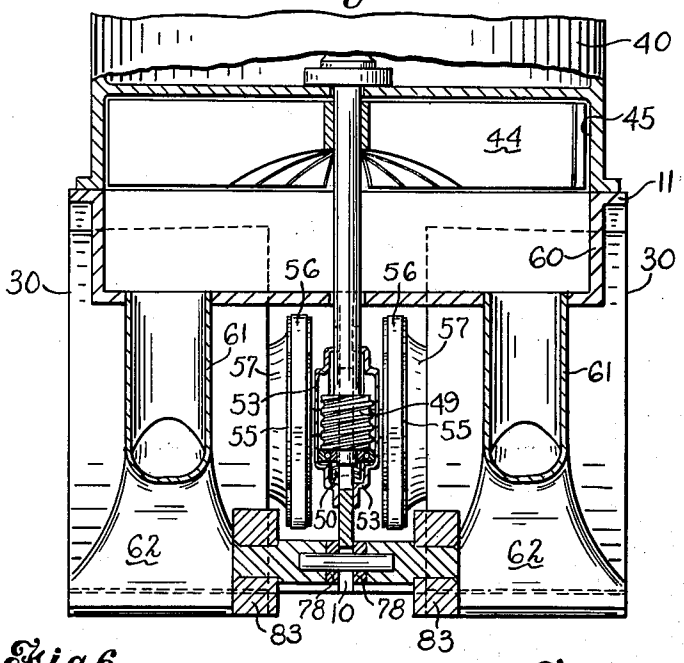


Fig. 6.

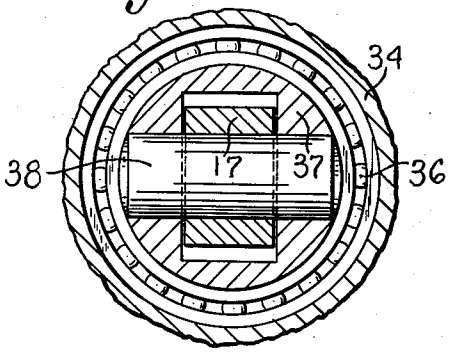


Fig. 7.

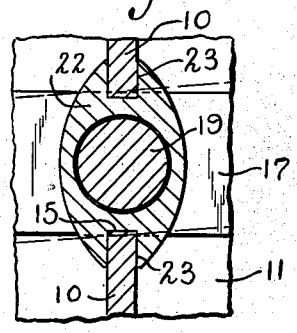
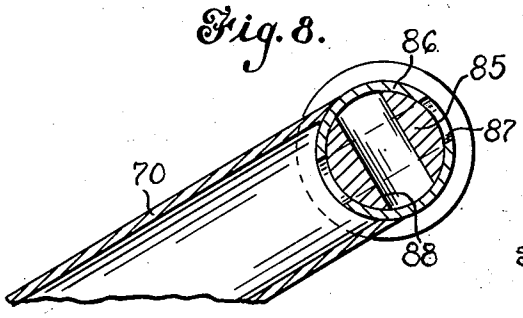


Fig. 8.



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2,588,707

UNITED STATES PATENT OFFICE

2,588,707

FLOOR SANDER

George F. Dwyer, Branford, Conn.

Application March 9, 1949, Serial No. 80,443

14 Claims. (Cl. 51—176)

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This invention relates to floor-sanding machines and more particularly to a device of this character having a plurality of power-driven sanding drums, two at each side of the machine, the drums being carried upon axles supported at their central portions whereby the drums may work up close to the walls of a room or the like, which would not be true if the axles were supported at their outer ends.

In the illustrated embodiment of my invention, four sanding drums are employed, two upon the ends of a front axle and the other two upon the ends of a rear axle. The drums are so driven that the rear drum and the forward drum on one side of the frame are rotated toward each other so that the drag or pull upon the machine will be neutralized, and a dust-collecting shoe may be positioned between these drums to carry away the abraded material.

Also as illustrated each of the axles upon which the drums are carried is pivoted to swing about a substantially horizontal axis extending longitudinally of the direction of travel of the machine so that the drums are permitted a pivotal movement about a point at the center of the machine, and in addition each drum is pivotally mounted on the end of the corresponding axle so that it may swing with respect to the axle about a pivot or axis also extending longitudinally of the direction of travel of the machine.

These pivotal movements permit the drums to adjust themselves to irregularities or unevenness in the surface of the floor. If, for example, the floor is inclined or slants in one direction, the axle may swing thus tilting both drums, but, if the slant on the floor on one side of the center line of the machine is different from that on the other side, then each drum may tilt individually about its pivot upon the axle so that one drum may accommodate itself to an incline in one direction and the other may accommodate itself to an incline in the other direction, if this is necessary.

The drums are driven from a motor carried upon the frame of the machine and, as illustrated, belts are employed to connect a countershaft driven by the motor with the rotating drums to drive the latter. It will be noted that the swinging movements of the drums, both with respect to the movement of the drums individually upon the axles and also due to the swinging of the axle itself, take place in a direction transverse to the direction of the pull upon the driving belts so that there is no tendency of the latter to cause tilting movements of the drums.

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It is also desirable to adjust the pressure of the drums upon the floor, and, in the present instance, this is effected by raising or lowering the frame with respect to the floor. To this end the frame of the device is carried upon wheels mounted upon a lever pivoted to the frame, which lever may be moved about its pivot to vary the distance of the wheels from the frame and, therefore, vary the height of the drums from the floor and hence the pressure of the drums on the floor. That is, the wheels may be so set that the entire weight of the machine will be carried by the drums or so that any part of this weight may be taken from the drums and carried by the wheels, thus relieving the pressure of the drums on the floor and, therefore, varying the abrading action.

Provision is made for carrying away the dust or abraded particles by a vacuum or suction device, and the suction produced by this device is also employed to drive a motor which serves to wind up a cable secured to the lever upon which the supporting casters are mounted so that the machine may be raised or lowered by power-operated means rather than by hand.

One object of the present invention is to provide a new and improved floor-sanding machine.

A further object of the invention is to provide a floor-sanding machine having a plurality of sanding drums in which each of the sanding drums will be permitted to tilt about an axis lying between the ends of the drum and also about an axis lying outside of the drum.

A still further object of the invention is the provision of a floor-sanding machine having front and rear axles pivotally mounted at their intermediate portions to swing about an axis disposed longitudinally of the frame of the machine and each of said axles having sanding drums mounted on the ends thereof, the sanding drums being pivotally mounted to tilt with respect to the axle about an axis parallel to the first axis.

A still further object of the invention is the provision of a sanding machine as described above in which the two drums upon the same side of the machine are operated in opposite directions whereby the travel of the machine over the floor may be regulated by applying either the front or rear pair of drums to the floor with greater or less pressure.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a side elevational view of a floor-sanding device embodying my invention;

Fig. 2 is a top plan view of the device;

Fig. 3 is a sectional view on line 3—3 of Fig. 2;

Fig. 4 is a partial sectional view on line 4—4 of Fig. 3;

Fig. 5 is a sectional view on line 5—5 of Fig. 4;

Fig. 6 is a detail sectional view on line 6—6 of Fig. 4;

Fig. 7 is a detail sectional view on line 7—7 of Fig. 4; and,

Fig. 8 is a sectional view on line 8—8 of Fig. 2.

To illustrate a preferred embodiment of my invention, I have shown a sanding machine comprising a main frame having a central plate member 10 and a shield or housing 11 extending over the drums and projecting laterally upon each side of the central frame member 10. The latter is disposed in a vertical plane and extends longitudinally of the machine, and the housing 11 extends in a substantial horizontal direction at its intermediate portion, but curves downwardly as shown at 12 at each end to project over the cylindrical drums to be hereinafter described. Bumpers 13 of rubber or the like may be provided upon each end of this housing to prevent marring the walls of the room when the machine reaches the end of its course.

As shown more particularly in Fig. 3, the central frame member is provided with front and rear openings 14, and forward and rear recesses 15 and 16 also provided in this member communicate with these openings. Front and rear axles 17 and 18 extend through these openings and project laterally on each side of the frame member 10, these axles being mounted on pivot members 19 and 20 which extend transverse to the axles or longitudinally of the frame of the machine. As shown more particularly in Figs. 4 and 7, the ends of each of these pivot members 19 and 20 are rotatably or pivotally mounted in bushings 21 and 22, these bushings being recessed, as shown at 23 in Fig. 7, so that the bushings may lie in the recesses 15 and 16 of the plate-like frame member 10, and the edges of these recesses in the plate member receive the recesses 23 as shown in this figure. With this arrangement, the axles 17 and 18 are readily removable as the bushings may be slipped into the opening 14 and removed from the frame member 10.

In order to prevent accidental movement of the bushings inwardly, a spring 25 is mounted upon the outer end of each of the pivot members 19 and 20, these springs acting between the axles 17 and 18 and the outer bushings 21 to urge the latter outwardly and thus prevent them from dropping out of the slots in the plate 10. These springs are relatively light and heavier springs 26 are mounted between the axles 17 and 18 and the inner bushings 22 so that these bushings will be forced inwardly with respect to the center of the machine, thus holding the bushings in the slots 16 and also tending to urge the axles 17 and 18 outwardly, that is, urge the front axle forwardly and the rear axle rearwardly as shown in Fig. 3, so that the driving belts will be maintained in taut condition, as will be hereinafter described.

The mounting of the sanding drums upon the front and rear axles 17 and 18 is shown more especially in Fig. 4 and as the mounting of each of these drums is identical, it will only be necessary to describe one thereof. It is understood that a sanding drum is mounted upon each end of the front axle as well as one upon each end of the rear axle, so that four sanding drums are employed in all. Each of these sanding drums, designated by the reference character 30, is provided with a central web 31 which carries a plurality of splines 32 fitting in grooves 33 upon the outer member 34 of a bearing race, which member is rotatably mounted by the bearings 35 and 36 upon an inner member 37. This latter member is pivotally mounted upon the axle (upon axle 17 in this instance) by the pivot pin 38, which passes through the axle and also through the inner bearing member 37. It may here be noted that the axis of the pivot pins 38 and the pivot members 19 and 20 extend longitudinally of the frame of the machine or in the direction of travel, so that the pivotal movements of the axles 17 and 18, as well as the pivotal movements of each of the drums on these axles, take place in planes transverse to the direction of the travel of the machine.

Mounted on the housing 11 of the frame is a casing 40 (Fig. 3) within which is mounted an electric motor 41 having a shaft 42 extending downwardly through an opening 43 in the frame plate 10, this shaft being located at the center of the frame. On the shaft 42 is mounted a suction fan or blower 44 in a chamber 45 in the lower portion of the casing 40, this chamber having an outlet 46 from which a tube 47 leads to the collector bag 48 (Fig. 1), so that, as will be hereinafter explained, the blower will suck up the abraded material and deliver it to the bag 48.

Upon the lower end of the shaft 42 is a worm 49 which drives front and rear worm wheels 50, these wheels being driven in opposite directions. The worm wheels 50 are secured upon shafts 51 and the drums are driven from these shafts as illustrated in Fig. 4. As the drive for the two front drums is duplicated for the rear drums, it will be necessary to describe only that for the front drums, as shown in Fig. 4. Each of the shafts 51 is rotatably mounted in bearings 52, which bearings are carried in twin housings 53, one of which is secured at each side of the frame plate 10, the two forming a chamber which encloses the worm wheels 50. The shafts 51 extend from the housing at each side and upon the extended ends of these shafts are secured sheaves or pulleys 55. A belt 56 is trained around each of these pulleys, and each of the belts extend forwardly so as to be trained around a second pulley 57 secured to the outer bearing member 34. These pulleys are also splined to the bearing members so that they may be removed therefrom. It will be noted that, as shown in Fig. 4, the spring 26 acting against the inner bushings 22 will urge the axle 17, which carries the drums, outwardly so that the belts 56 will be maintained in taut condition. Thus, the drums will be driven by the pulleys while, at the same time, they will be permitted the pivotal movements both about the pivot members 19 and 20 as well as about the pivot members 36.

At its central portion, the housing 11 is depressed to form a channel-shaped trough 60 (Figs. 3 and 5) which extends transversely across the machine and which communicates at its upper end with the chamber 45 in which the blower 44 is mounted. A tubular member 61 extends downwardly from each end of this trough (Fig. 5) and each of these members is bifurcated at its lower end to provide spaced shoes 62 adjacent the level of the floor, and also adjacent each of the sanding drums. Adjacent the lower ends of these shoes openings 63 are provided, which face

the sanding drums so as to collect the abraded material and permit the blower **44** to draw this material upwardly and discharge it through the tube **47** into the bag **48**.

In the upper end of the casing **40** is provided a chamber **65** within which is mounted a suction driven rotor **66**. The chamber **65** communicates through a tube **67** on the exterior of the casing **40** with the chamber **45** of the suction blower **44** so that, when the latter is operating, it will draw air through the chamber **65** and thus operate the rotor **66**. The chamber **65** is provided with an air-admission opening **69** which communicates with the atmosphere through the hollow handle **70** rotatably mounted on the upper end of the casing and secured in any adjusted position by the screw **71**. When the screw **71** is loosened, the handle **70**, as shown in dotted lines in Figs. 1 and 2, may be rotated about a vertical axis so as to be disposed either at the rear or at the side of the machine.

The rotor **66** is secured to a shaft **73** rotatably mounted in the upper and lower members of the chamber **65**. This shaft extends upwardly from the chamber and a cord **74** is wound about this extended end so that, when the rotor **66** turns, the cord will be wound up upon the shaft **73**. The cord is trained over a pulley **75** and extends downwardly through an opening **76** in the housing and is passed through an opening **77** in the end of one of a pair of levers **78**, the other end of the cord being secured to the casing at **79**.

One of the levers **78** is mounted upon each side of the central frame member **10** in close juxtaposition to this member, as shown in Fig. 4. The two levers are secured together by a bolt **80** which extends through a slot **81** in the frame plate **10**, and the levers are pivoted to the frame plate at **82** upon a horizontal axis. The levers extend rearwardly from this pivot point and upon their rear ends are mounted wheels **83** (Figs. 3 and 5) so that when the levers are moved about the pivot **82** the wheels will be raised and lowered with respect to the frame of the machine, and in this way the pressure of the sanding drums upon the floor may be relieved to any extent desired.

It will also be apparent that the frame will be rockably supported upon the wheels **83** so that it may be tipped forwardly or rearwardly upon these casters to vary the pressure of the forward drums upon the floor with respect to that of the rear drums. As shown in Fig. 3, the forward drums rotate in a counterclockwise direction and the rear drums in a clockwise direction. Hence the contact of the forward drums with the floor will tend to cause the machine to travel in a forward direction, while the rotation of the rear drums in contact with the floor will tend to cause the machine to travel in a reverse direction. When the pressure is substantially equal, there will be no tendency for the machine to travel, and hence the travel of the machine over the floor in either direction desired may be effected by tilting the frame upon the wheels **83** to cause either the front or rear drums to engage the floor with greater pressure.

This tilting of the frame is effected by means of the handle **70** which is provided at its upper end with a bar **85** extending transversely of the hollow member **70**. This bar **85** is rotatably mounted in the upper end of the handle member in a sleeve **86** provided with an opening **87**. The bar **85** is provided with a through opening **88** which serves as a valve upon rotation of the bar

to admit air to the hollow handle **70**. It will be apparent that when this valve is closed no air will be admitted to the hollow handle **70** and hence the rotor **66** will remain at rest. However, if the operator wishes to exert a lifting force on the levers **78**, the bar **85** is rotated to admit sufficient air to the hollow handle **70** to operate the rotor **66**, and any desired tension may be applied to the levers by adjustment of this valve to the proper opening so that the effect of the air drawn through the hollow handle **70** on the blades of the rotor **66** will just balance the action of gravity tending to lower the frame on the wheels **83**. When it is desired to lower the frame, the valve bar **85** will be turned to close the opening **87** and the frame will thereupon drop under the force of gravity.

Upon the peripheral surface of each of the sanding drums **30** is provided a rubber tire **90**, and it will be understood that the sanding belt or sleeve (not shown) is slipped over the outer surface of this tire. The outer surface of each of the tires **90** is frusto-conical in shape tapering slightly, or at an angle of about 3°, toward one end of the drum so as to provide the drum with a tapered exterior surface and, as previously explained, the drums may be removed from the bearing members **34** and reversed in position so that either the larger or smaller ends may be disposed outwardly. The endless sanding belt or sleeve which is applied to the drum will also be slightly tapered or frusto-conical in shape, but the taper of this sleeve will be less than that of the drum, for instance about 1½°. This differential in the taper of the drum and sanding belt will cause the belt to warp on to the drum during the rotation of the latter, the sleeve working toward the larger end of the drum until the larger end of the sleeve, which is slightly smaller than the larger end of the drum, will reach an end or stop position where it will be wedged tightly in place. This warping action takes place, of course, when the drum is rotated on the floor against frictional resistance.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the claims.

What I claim is:

1. A floor-sanding machine comprising a frame, an axle pivoted to the frame to swing about an axis disposed longitudinally of the direction of travel of the machine, a sanding drum, and means for mounting said drum on said axle for rotational movement and for pivotal movement about an axis parallel to said first axis.

2. A floor-sanding machine comprising a frame, an axle pivoted to the frame to swing about an axis disposed longitudinally of the direction of travel of the machine, said axle extending laterally on both sides of its pivot, and a sanding drum carried by each of the laterally extending portions of said axle, and each of said drums being connected to said axle for rotational movement and for pivotal movement with respect thereto.

3. A floor-sanding machine comprising a frame, an axle pivoted to the frame to swing about an axis disposed longitudinally of the direction of travel of the machine, said axle extending laterally on both sides of its pivot, and a sanding drum carried by each of the laterally

extending portions of said axle, each of said drums being connected to said axle for rotational movement about the axle and for pivotal movement about a point substantially at the center of the drum.

4. A floor-sanding machine comprising a frame, an axle pivoted to the frame to swing about an axis disposed longitudinally of the direction of travel of the machine, said axle extending laterally on both sides of its pivot, and a sanding drum carried by each of the laterally extending portions of said axle, each of said drums being connected to said axle for rotational movement about the axle and for pivotal movement about an axis transverse to the axle, said axis intersecting said axle substantially at the center of the drum.

5. A floor-sanding machine comprising a frame having front and rear axles, each axle being pivoted to the frame about an axis extending longitudinally of the direction of travel of the machine and about a point intermediate its ends whereby each axle extends laterally on both sides of its pivot, a sanding drum carried adjacent the end portion of each axle, each of said drums being connected to the axle for rotational movement and for pivotal movement with respect thereto about a point between the ends of the drum.

6. A floor-sanding machine comprising a frame having front and rear axles, each axle being pivoted to the frame about an axis extending longitudinally of the direction of travel of the machine and about a point intermediate its ends whereby each axle extends laterally on both sides of its pivot, a sanding drum carried adjacent the end portion of each axle, each of said drums being connected to the axle for rotational movement and for pivotal movement with respect thereto about an axis parallel to that of the pivotal movement of the axle.

7. A floor-sanding machine comprising a frame having front and rear axles, each axle being pivoted to the frame about an axis extending longitudinally of the direction of travel of the machine and about a point intermediate its ends whereby each axle extends laterally on both sides of its pivot, a sanding drum carried adjacent the end portion of each axle, each of said drums being connected to the axle for rotational movement and for pivotal movement with respect thereto about an axis parallel to that of the pivotal movement of the axle, and means for rotating said drums, the drums on said rear axle being rotated in a direction opposite to that of the drums on said front axle.

8. A floor-sanding machine comprising a frame having front and rear axles, each axle being pivoted to the frame about an axis extending longitudinally of the direction of travel of the machine and about a point intermediate its ends whereby each axle extends laterally on both sides of its pivot, a sanding drum carried adjacent the end portion of each axle, each of said drums being connected to the axle for rotational movement, means for rotating the drums on the front axle in one direction and the drums on the rear axle in the opposite direction, and dust-collecting means between the front and rear drums on each side of the frame.

9. A sanding machine comprising a frame, front and rear axles on said frame, a sanding drum rotatably mounted on each end of each of said axles, floor-engaging wheels below the frame and disposed between the front and rear axles, a lever mechanism on which said wheels are mounted, said mechanism being pivoted to the frame, and means for raising and lowering said lever mechanism about said pivot to raise and lower the frame with respect to the wheels, said means comprising a fluid-operated motor.

10. A sanding machine comprising a frame, front and rear axles on said frame, a sanding drum rotatably mounted on each end of each of said axles, floor-engaging wheels below the frame and disposed between the front and rear axles, a lever mechanism on which said wheels are mounted, said mechanism being pivoted to the frame, means for raising and lowering said lever mechanism about said pivot to raise and lower the frame with respect to the wheels, said means comprising a fluid-operated motor, and dust-collecting means comprising an exhaust pump on the frame, said motor being operated by said pump.

11. A sanding machine comprising a frame, an axle supported by the frame and a sanding drum rotatably mounted at each end of the axle, the axes of which are in substantial alignment, each of said drums being of frusto-conical shape and being pivoted to the axle to swing relatively to the axle about an axis transverse to the axle.

12. A sanding machine comprising a frame, an axle supported by the frame, a sanding drum rotatably mounted at each end of the axle, the axes of which are in substantial alignment, each of said drums being of frusto-conical shape and being pivoted to the axle to swing relatively to the axle about an axis transverse to the axle, and means mounting said drums removably on said axle, said means permiting each of the drums to be reversed in position on the axle.

13. A sanding machine comprising a frame, a sanding drum rotatably mounted at each side of the frame, the axes of which are in substantial alignment, each of said drums being of frusto-conical shape, an axle carried by the frame bearing sleeves pivotally mounted on said axle, and each of said drums being splined to one of said bearing sleeves whereby it may be reversed in position with respect to the frame of the machine.

14. A floor-sanding machine comprising a frame, a plurality of sanding drums rotatably carried thereby, the outer surface of each of said drums being of frusto-conical shape, an endless sanding belt on each of said drums and each of said belts being of frusto-conical shape and having a taper less than that of the drum upon which it is mounted.

GEORGE F. DWYER.

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