June 23, 1936. R. A. PONSELLE 2,045,406

FLOOR MACHINE

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Fig. 1.

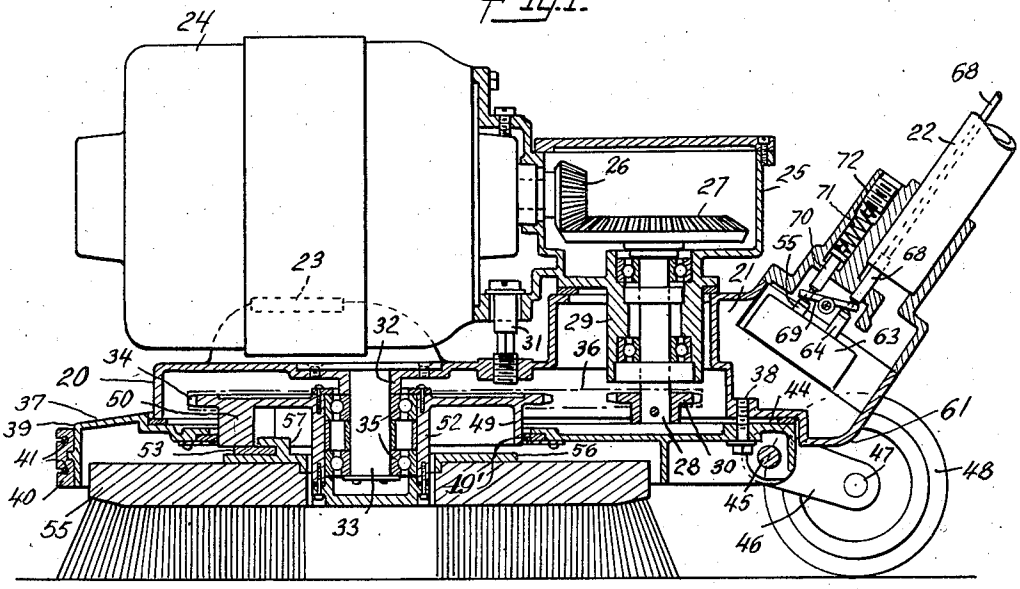


Fig. 2.

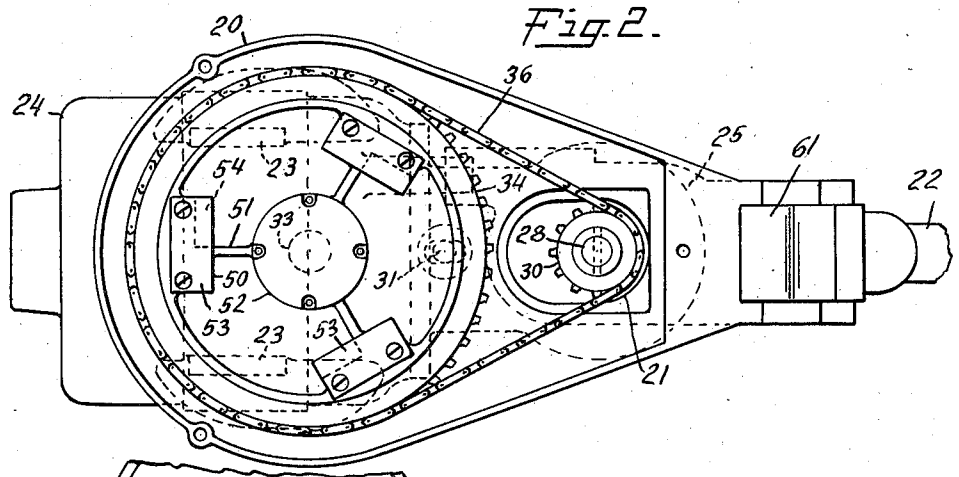
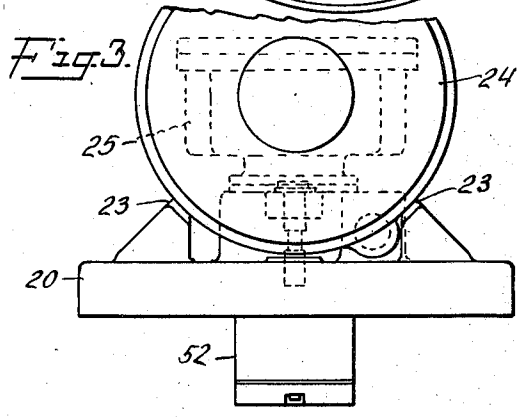


Fig. 3.



INVENTOR
Robert A. Ponselle
BY
Pennie Davis, Marvin Edmonds
ATTORNEYS

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Fig. 4.

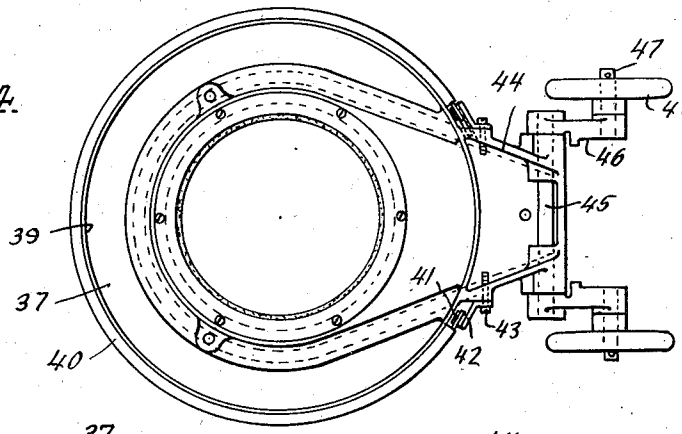


Fig. 5.

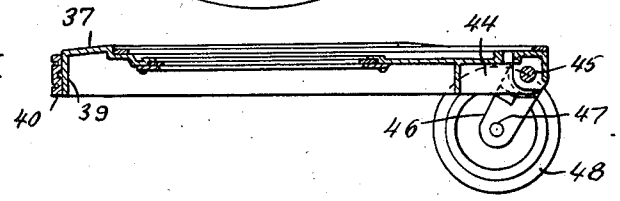


Fig. 6.

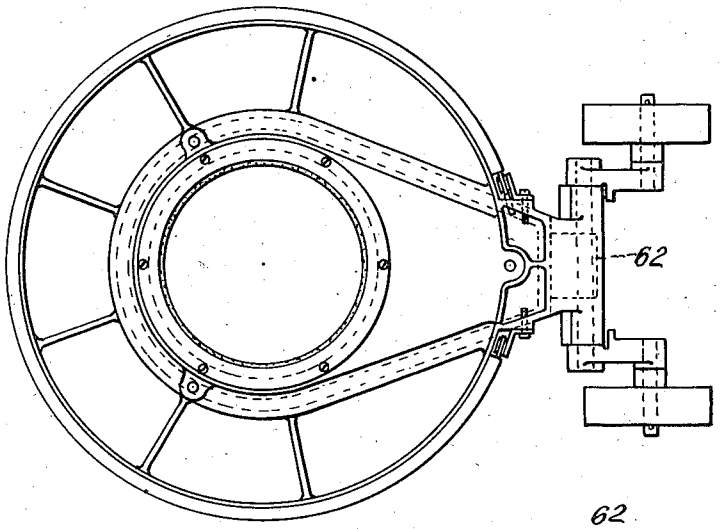
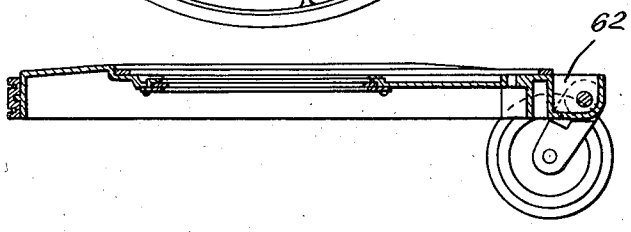


Fig. 7.



INVENTOR
Robert A. Ponselle
BY
Pennie Davis Marvin & Edmonds
ATTORNEYS

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Fig. 8.

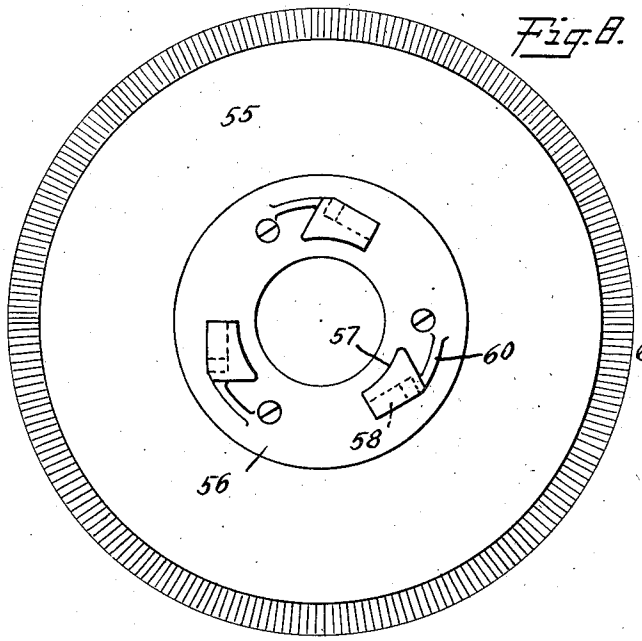


Fig. 10.

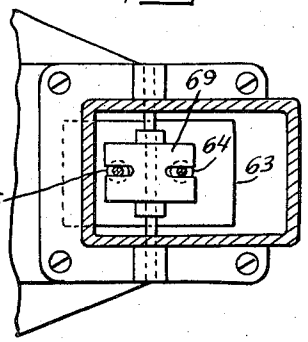


Fig. 9.

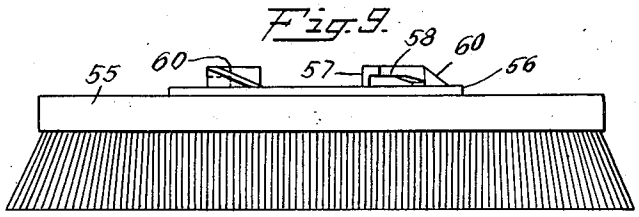


Fig. 11.

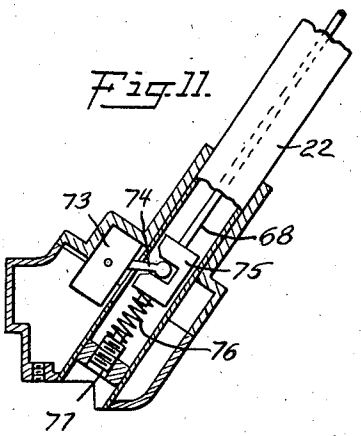
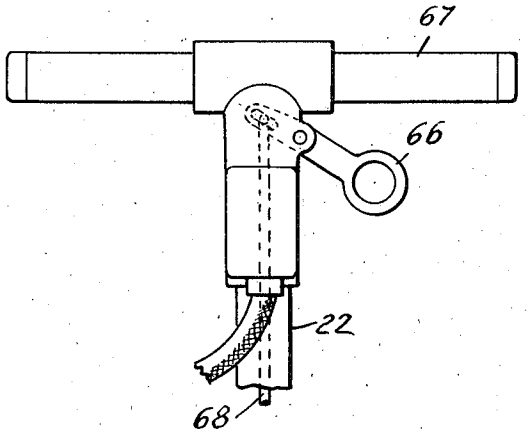


Fig. 12.



INVENTOR
Robert A. Ponselle
BY
Pennie Davis Marvin & Edmonds
ATTORNEYS

Patented June 23, 1936 2,045,406

UNITED STATES PATENT OFFICE

2,045,406

FLOOR MACHINE

Robert A. Ponselle, New York, N. Y.

Application December 16, 1933, Serial No. 702,702

8 Claims. (Cl. 15—49)

This invention relates to floor treating machines of the type which includes a motor driving a tool, such as a brush, with the tool supporting the weight of the machine when it is operating on the floor surface. More particularly, the invention is concerned with a floor machine of the type described which includes numerous novel features of construction which make it possible to use the same machine most advantageously for a number of different purposes, simplify the operation of the machine, and add to its durability.

Floor machines of the type described have been constructed in various ways and one such machine which has been sold commercially in substantial quantities includes a base which is provided with a rolling support and to which is attached a handle. Mounted on the base is the electric motor which drives a sprocket wheel journaled on the under side of the base and provided with means by which it may be detachably connected to the operating element or tool, such as a flat circular brush. The rolling support may be swung on the base into and out of operative position, and, when the machine is in operation, the support is moved clear of the floor so that the weight of the machine then rests entirely on the tool which lies on the floor surface. In order to keep the tool from doing damage to the walls and furniture, the machine is provided with a protecting apron which lies over the top and extends down the sides of the tool a short distance.

With such machines, it is desirable to use tools of different diameters for different purposes as, for example, a machine with a small diameter tool may best be used in a classroom in which there are desks permanently installed, while a machine with a larger diameter tool is preferred for treating an open floor of large area, such as a hall. However, these machines have not heretofore been constructed in such manner that tools of different sizes could be used in the same machine and thus a single machine has not been adapted to give best results under all conditions of use.

Floor machines of the type described are provided with control switches mounted on a convenient part of the handle of the machine and the switches heretofore used have been of either the automatic or manually closing types. When such a machine is used on a floor, the surface of which is of restricted area or broken up by furniture fixed in position, the operator finds an automatically opening switch most convenient but such a switch is tiring when the machine is used on floors of considerable size and can be run without stopping for substantial periods of time. In the prior machines, the switches are installed as a permanent part of the machine and the substitution of one type of switch for the other cannot be readily made. Accordingly, the machines are not well adapted for general use on different kinds of floors.

Another objectionable feature of floor machines as heretofore constructed is that it has not been convenient to take up slack in the driving connections, the adjustment of the parts necessary for that purpose being somewhat difficult to make.

The present invention is directed to the provision of a new floor machine which overcomes the difficulties above pointed out and with this new machine tools of different sizes may be readily employed, the changes necessary for the replacement of one tool by another being simple and easily made on the job. The new machine also includes a control switch of novel construction which can be converted by a simple adjustment from automatic to manual operation or vice-versa, so that whichever type of switch is most convenient to the operator may be used as desired. The machine has a new type of motor mounting which permits easy adjustment of the tautness of the driving connections and it also includes new means for connecting the tool to the driving connections and a new bumper on the tool apron. Because of these various novel features of construction, a single machine may be used for all purposes with best results and the machine is easier to maintain in proper working condition and is more durable than prior machines.

For a better understanding of the invention, reference may be had to the accompanying drawings, in which

Figure 1 is a view of the new machine in vertical section with certain parts shown in side elevation;

Figure 2 is a bottom plan view of the machine with the tool removed;

Figure 3 is a fragmentary end view of the machine with certain parts removed;

Figure 4 is a bottom plan view of the apron of the machine;

Figure 5 is a sectional view through the apron;

Figures 6 and 7 are bottom plan and sectional views, respectively, through a different form of apron;

Figure 8 is a top plan view of one of the tools used in the machine;

Figure 9 is a view of the tool in side elevation;

Figure 10 is a sectional view showing a part of the new switch used on the machine;

Figure 11 is a sectional view illustrating a different form of switch; and

Figure 12 is a view of a portion of the handle of the machine.

Referring now to the drawings, the machine illustrated includes a base 20 having a hollow extension 21 at one end and the machine is controlled by means of a handle 22, one end of which is received in an opening in the extension. Mounted on top of the base and supported on spaced cradle members 23 is an electric driving motor 24, and a gear box 25 is attached to the end of the motor casing. The shaft of the motor projects into the box and carries a bevel gear 26 which meshes with another bevel gear 27 within the box and mounted on a shaft 28. Extending downward from the under side of the box is a hub 29 in which the driving shaft is supported in spaced bearings and the hub extends through an elongated opening in the projection 21 on the base. The shaft 28 projects out of the hub and on its lower end is a sprocket wheel 30 which lies within the hollow under side of the base. The gear box rests on a felt washer on top of the extension 21 and the box is held in this position and the motor is held in contact with the cradle members by a bolt 31 which is threaded into a boss in the top of the base and passes through an opening in the gear box.

Mounted in a hub 32 on the under side of the base is a stud 33 on which the sprocket wheel 34 is journaled, two sets of bearings 35 being interposed between the stud and the sprocket wheel. The sprocket wheel 34 is driven by sprocket wheel 30 through a chain 36 and to tighten the chain, the sprocket wheel 30 may be moved along the base in the direction of the handle 22. For this purpose, the single holding bolt 21 is backed off and the motor and gear box moved in the proper direction. When the chain has been tightened to the desired degree, the bolt is again drawn up tight and this holds the motor and gear box structure securely in position on the three point support provided by the cradle members and extension 21.

Attached to the under side of the base is the apron 37 which protects the tool and this apron is secured in position on the base by suitable screws 38. The apron has a central opening through which a portion of the sprocket wheel 34 projects and also has a downwardly extending flange 39 provided with a bumper 40 which may be a strip of rubber or like material held in place by a suitable wire 41 overlying the strip. The wire is continuous and formed into a loop, each end of which passes around a stud on a bracket 42 bolted as at 43 to the side of the apron. By tightening the bolts, the wire is drawn taut against the bumper strip and holds it firmly in place.

The apron is provided at one side with an extension 44 on which the rolling support is mounted and for this purpose, the extension carries a shaft 45 on the ends of which the arms 46 are rigidly mounted. In the free end of each arm is a stud 47 on which a wheel 48 is mounted for free rotation and when the machine is not being used to operate on a floor the arms are swung down as shown in Figure 5 so that a portion of each arm contacts with a part of the apron and the wheels are in supporting position. When the machine is in service and its weight is to rest on the tool, the arms are swung upwardly to a position in which the wheels are out of contact with the floor.

The sprocket wheel 34 is provided on its under surface with a circumferential flange 49 and this flange passes through the central opening in the apron 37. Adjacent the opening, the apron carries a removable flat ring 49', the inner edge of which lies close to the outer surface of the flange 49, and with this arrangement, the flange and a part of the apron cooperate to prevent dirt and water from entering the space underneath the base in which are the driving connections. The flange 49 drives the tool and for this purpose, the flange is provided at intervals with enlarged portions or bosses 50 connected by radial ribs 51 to the central hub 52. A tool driving plate 53 is secured by screws or the like on top of each of the bosses 50 and the plate has a portion 54 which lies free of the boss and is employed to engage a driving member on the tool.

In the prior construction, each driving plate has been mounted on a boss on the sprocket wheel with one entire end of the plate free of the boss and with that arrangement the plates were frequently broken in service. In the construction shown, each plate is supported along one side throughout its entire length and a portion only of the other side is unsupported and serves for driving purposes.

The tool 55 used in the machine is of circular form and the tool illustrated is a brush, the back of which carries a ring 56 with spaced driving members thereon. Each driving member comprises a boss 57 integral with the plate and a driving member 58 extends laterally from the boss, this member being connected to the boss along one side and one end thereof. Beyond the driving plate, the boss is provided with an inclined rib 60 which leads down from the top of the boss to the surface of the plate 56.

In order to mount the tool on the sprocket wheel, the machine may be tilted upwardly, the tool slipped under the apron, and its driving members placed in registry with the driving plates on the sprocket wheel and moved into engagement therewith by a partial turning movement of the tool. In some cases, the workman may connect the tool to the machine by placing the tool on the floor and then bringing the machine to rest with the driving plates on the sprocket wheel 34 resting on the ring 56 on the back of the tool. The motor of the machine is then started, and as the sprocket wheel is rotated, the driving elements thereon engage those on the tool. Occasionally in prior machines, this method of attaching the tool has caused injury to the ring 56 on the tool because when the workman brings the machine to rest on top of the tool, the driving plates on the machine may rest on top of the driving members on the tool. Then, when the motor is started, the initial turning movement of the sprocket wheel causes the driving plates thereon to fall upon the plate 56 under the full weight of the machine. With the new construction, the ribs 60 on the tool plate prevent any sudden dropping of the weight of the machine on the tool plate and injury to the plate is thereby avoided

In the machines as heretofore constructed, the rolling support for the machine has been mounted directly on the base and the position of the support relative to the center of the sprocket

wheel has limited the size of the tool and apron that can be used. In the present machine, the rolling support is mounted on the apron and consequently, aprons and tools of different diameters may be employed on the same machine. In Figure 4, there is illustrated an apron of relatively small diameter which may be employed on the new machine and this apron is also shown mounted on the machine in Figure 1. As illustrated in the latter figure, the extension 44 on the apron terminates closely adjacent to the inner side of the downwardly extending portion 61 on the base. The apron shown in Figure 6 is of substantially greater diameter than that shown in Figure 4 and when the larger apron is mounted on the machine, the extension 61 on the base enters a recess 62 in the extension on the apron.

Since the apron is attached to the machine only by a few screws and the aprons are readily interchangeable, the tools may be changed so that the machine may be equipped with the tool best suited to the purpose for which the machine is to be used.

The new machine is provided with an operating switch which may be employed either as an automatically opening switch or a manually opening switch, as the operator may desire, the change from one style of operation to the other requiring only a simple adjustment.

One form of the new switch mechanism is illustrated in Figure 1 and it includes a two-button switch 63 of standard construction suitably mounted within a portion of the extension 21 from the base of the machine. This switch is provided with operating buttons 64 and 65 and when button 64 is pushed inward, the contacts within the switch are closed to supply current to the motor and button 65 moves outward. When button 65 is moved inward, the contacts are opened to stop the flow of current and button 64 moves out.

The switch is operated by a handle 66 pivotally mounted adjacent the crossbar 67 at the end of the handle 22 and leading down within the hollow handle 22 is a rod 68 connected to the tail of handle 66. The rod 68 extends into the extension 22 on the base and it is provided near its lower end with a portion of reduced diameter passing through a slot in a plate 69 and, if desired, connected to the upper end of switch button 64. The plate 69 is pivoted on an axis lying between the switch buttons and the end opposite to that through which the reduced portion of the rod 68 passes is provided with a slot through which passes a portion of reduced diameter of a plunger 70 acted on by a spring 71, the end of the plunger, if desired, being connected with switch button 65. The spring 71 is held in engagement with the plunger and under suitable comression by a screw 72 threaded into the wall of extension 21 and when the screw is threaded inward and compresses the spring to the desired degree, the force behind the plunger 70 is sufficient to tilt the plate 69 and cause button 65 of the switch to move inward when the handle 66 is released. When the machine is in operation, the operator pulls up on the handle 66 and this movement is transmitted to the switch and causes button 64 to move in, and button 65 to move out and force plunger 70 back against its spring. When the handle 66 is released, spring 71 moves the plunger 70 down, forcing button 65 inward. At the same time, plate 69 is rocked to push up on rod 68 and swing handle 66 down.

When it is desired to use the machine for long periods of operation, the switch may be changed from automatic to manual opening and, for this purpose, the screw 72 is backed off to release the compression on the spring 71. A few turns of the screw are sufficient for the purpose and when the compression of the spring is decreased to the proper extent, it has no effect on plunger 70. Accordingly, when the operator closes the switch, it will stay in closed position until it is manually opened by movement of handle 66 in the proper direction.

The switch shown in Figure 1 is of the two-button type but the new switch mechanism may include a standard switch 73 having a handle 74, which is swung from one side to the other to open and close the switch (Fig. 11). To operate the handle 74, the rod 68 is provided with a block 75 having an opening for the reception of the handle and a spring 76 bears at one end against the end of the block 75 and at the other against a screw 77 threaded into the base. When the screw is turned in to compress the spring to a sufficient extent, the spring moves the block to close the switch whenever the operating handle 66 of the switch mechanism is released. When the screw 77 is backed away from the spring, the opening and closing of the switch must be effected by appropriate movements of the handle 66.

It will be seen that the new machine includes many novel features which make it much better adapted for general purposes than machines as made heretofore. The new machine can be used with small or large diameter tools, and its control switch may be adjusted for automatic or manual opening as desired; it is of greater durability than the prior machines because of the new type of driving connection provided between the tool and the driving sprocket wheel, and injury to the tool during its attachment is prevented by the new driving means on the tool. The mounting of the motor on the base is of simple construction and permits adjustments necessary to maintain the driving connections taut to be easily made, and the new bumper mounting holds the bumper strip securely in position and permits easy replacement of the strip when that is necessary.

I claim:

1. In a floor machine, the combination of a base, a rotary tool mounting on the base, a motor, a mounting for the motor on the base, said motor being movable along its mounting, a driven shaft connected to said motor to be driven thereby and extending through an opening in said base, a mounting for said shaft attached to the motor and movable with the motor relative to the motor mounting, a flexible driving element beneath the base connecting said driven shaft and tool mounting, and means for securing said motor in different positions on its mounting, the movement of said motor and shaft mounting in a direction away from said tool mounting increasing the tension on said flexible driving element.

2. In a floor machine, a base, spaced supporting bosses on said base, a driving motor on said base having its housing resting on said bosses, a gear box attached to the end of said housing and resting on a part of said base, said box having a hub projecting through an elongated opening in the base, a drive shaft within said hub, gear-

ing within the gear box connecting the motor and drive shaft, a sprocket wheel on said shaft and lying beneath said base, a rotary tool mounting rotatably secured beneath said base, a flexible driving connection between said sprocket wheel and mounting, and a bolt connecting said base and motor housing for holding said housing on its bosses and said box in contact with the base, said motor and box being adjustable relative to said base to maintain said driving connection taut.

3. In a floor machine, the combination of a base having a depending flange, a driving motor mounted on the base, a rotary element mounted on the under side of said base within said base flange, driving connections between said element and motor, part of said connections lying on the under side of said base within said base flange, a circular flange on the underside of said element, a tool removably secured to said element flange, and an apron removably secured to the under side of said base against said base flange, said apron having a depending flange enclosing the upper part of said tool, said apron having a central opening in its top through which said element flange projects with a snug fit, said apron, base, and element flange preventing access to said element and driving connections, the overall diameter of said element flange being less than that of said opening.

4. In a floor machine, the combination of a base having a depending flange, a motor mounted upon the base, a tool mounting mounted for rotation on the base beneath the latter and within the base flange, a driving connection between the motor and the tool mounting, a portion of said connection lying beneath the base and within the base flange, and an apron secured to the base with its top against the base flange, said portion of the driving connection lying between the top of the apron and the underside of the base, said apron having a depending flange enclosing part of said tool and having an opening in its top through which the tool mounting freely extends, the top of the apron, the base, and the tool mounting providing an enclosure for said part of the driving connection and said apron being readily dismountable from the base while the tool mounting remains in position.

5. In a floor machine, the combination of a base having a depending flange, a motor mounted on said base, a tool mounting mounted for rotation beneath the base, a driving connection between the motor and the tool mounting, a part of said connection lying beneath the base within the base flange, and an apron having a top on which the base rests on its flange, and also having a depending flange enclosing a portion of a tool attached to said mounting, said apron being readily detachable from the base and having an opening in its top through which a portion of the tool mounting freely extends, said portion of the tool mounting having an overall diameter less than the diameter of said opening, the top of the apron, the base, and said portion of the tool mounting providing an enclosure for said part of the driving connection.

6. In a floor machine the combination of a base, a motor mounted on said base, a tool mounting mounted for rotation beneath the base, said mounting being provided with a circular flange extending downward therefrom, a driving connection between the motor and the tool mounting for rotating the latter, a portion of said connection lying beneath said base, an apron having a top and a depending flange adapted to provide a partial enclosure for a tool attached to said mounting, and means for securing said apron to said base with the top of said apron in spaced relation to said base, said top lying beneath said portion of the driving connection, and said apron having an opening in its top through which the flange on said tool mounting extends, the top of the apron, the base, said means, and said flange providing an enclosure for said part of the driving connection, the overall diameter of said flange being less than that of said opening and said apron being readily dismountable from the base while the tool mounting remains in position.

7. In a floor machine, the combination of a base, a motor mounted on said base, a tool mounting mounted for rotation beneath said base, said mounting being provided with a circular flange extending downward therefrom, a driving connection between the motor and the tool mounting enabling the motor to rotate the tool mounting, a portion of said driving connection lying beneath said base, a plate member lying beneath said base in spaced relation thereto, and a flange member extending between said base and plate member, said plate member lying beneath said portion of the driving connection and having an opening through it through which the flange on said tool mounting extends, said plate member, flange member, base, and tool mounting flange cooperating substantially to enclose said part of the driving connection, the overall diameter of said tool mounting flange at the free end thereof being less than that of the opening in said plate member, and said plate member being dismountable from the machine while the tool mounting remains in position.

8. In a floor machine, the combination of a base, a motor mounted on said base, a tool mounting mounted for rotation beneath said base and provided with a circular flange extending downward therefrom, a tool on said mounting, a driving connection between the motor and the tool mounting enabling the motor to rotate the tool mounting and tool, a portion of said driving connection lying beneath said base, a plate member lying beneath said base in spaced relation thereto and projecting outward beyond the periphery of said tool, said plate member lying beneath said portion of the driving connection and having an opening through it through which the flange on said tool mounting extends, a ring mounted in said opening and terminating close to the outer surface of the tool mounting flange, and a flange member extending between said base and plate member, said base, plate member, flange member, ring, and tool mounting flange cooperating to provide a substantial enclosure for said part of the driving connection, said plate member being readily dismountable upon removal of said tool with said tool mounting remaining in position.

ROBERT A. PONSELLE.