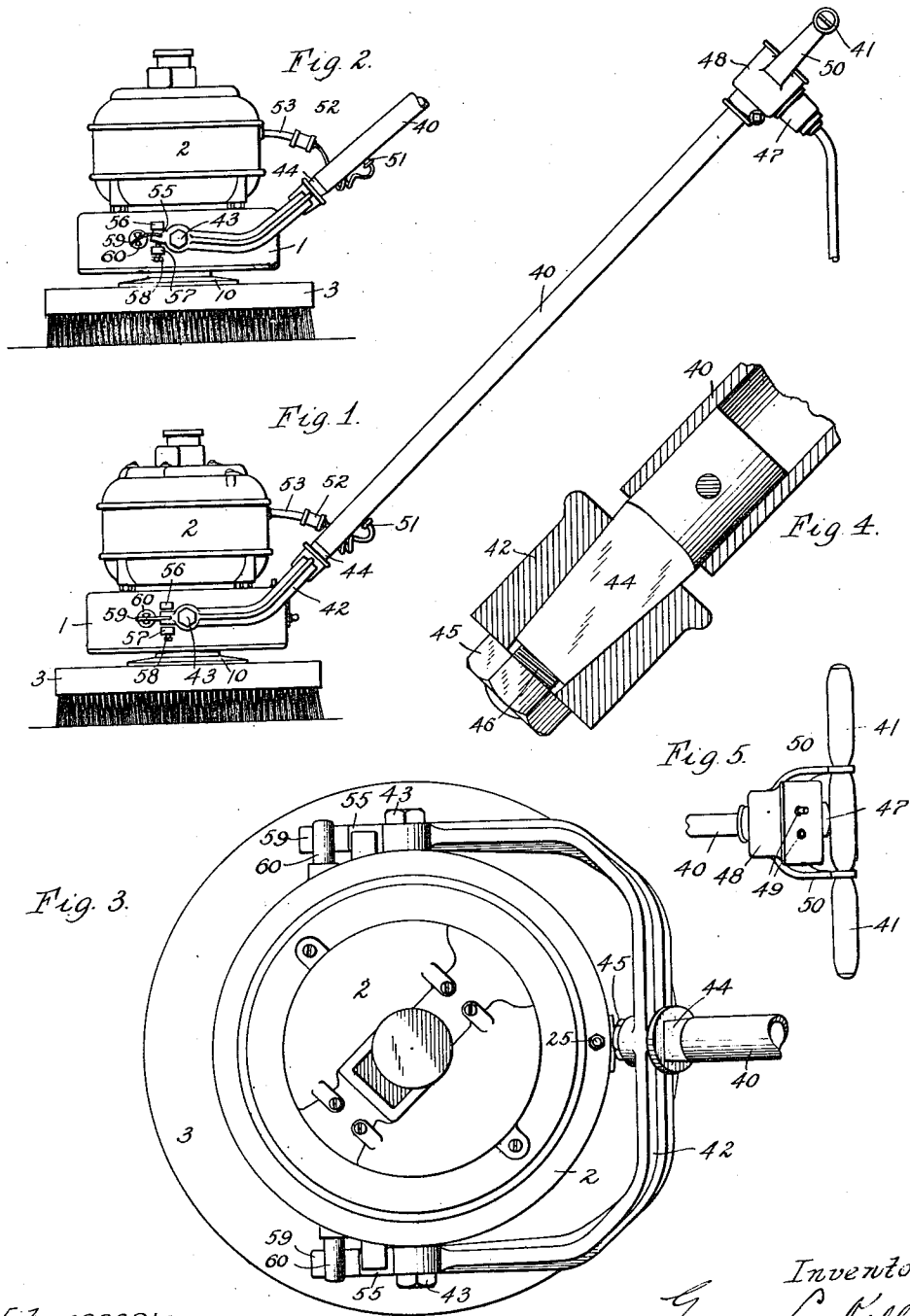


G. L. KELLEY.
FLOOR MACHINE.
APPLICATION FILED JULY 22, 1913.

Patented Apr. 18, 1916.
2 SHEETS—SHEET 1.

1,179,727.



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Fig. 6.

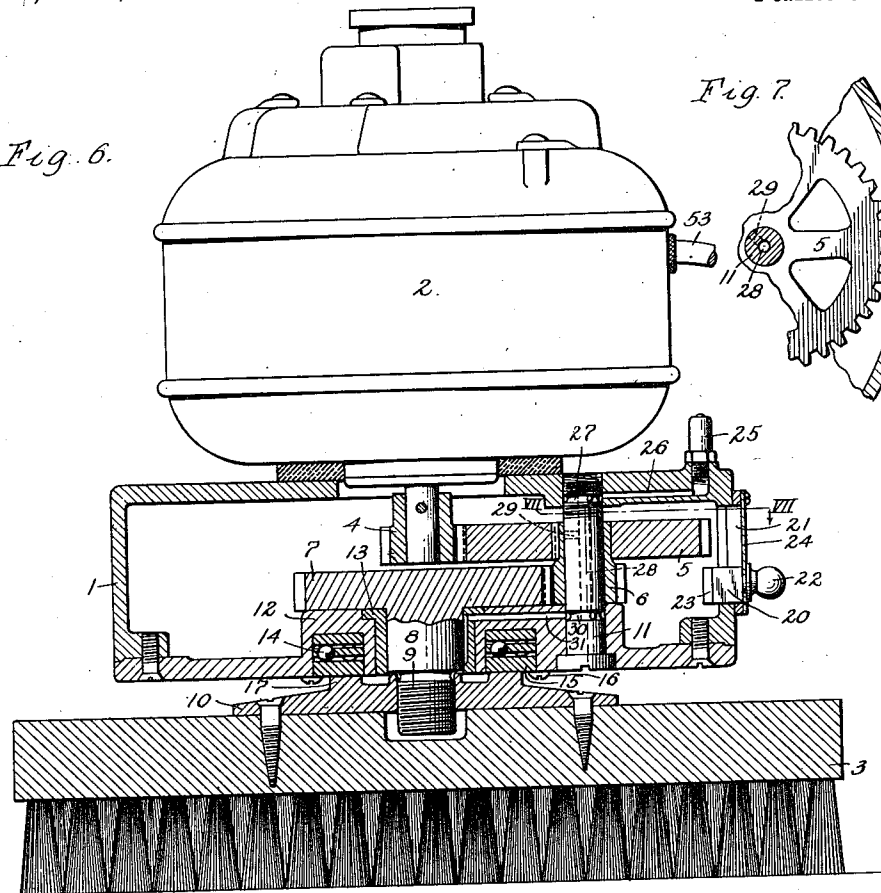


Fig. 7.

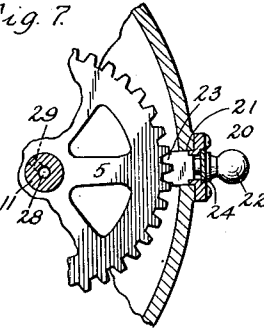


Fig. 8.

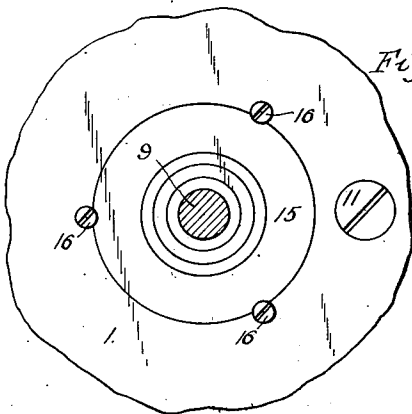
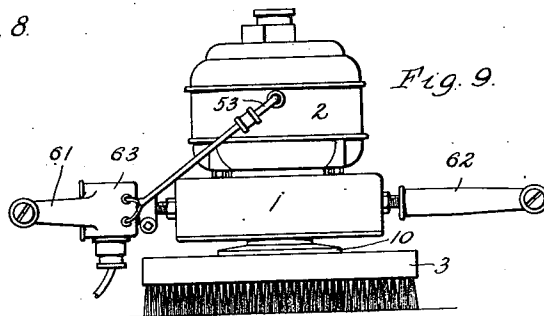


Fig. 9.



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UNITED STATES PATENT OFFICE.

GEORGE L. KELLEY, OF BUFFALO, NEW YORK, ASSIGNOR TO KELLEY ELECTRIC MACHINE COMPANY, OF BUFFALO, NEW YORK.

FLOOR-MACHINE.

1,179,727.

Specification of Letters Patent.

Patented Apr. 18, 1916.

Application filed July 22, 1913. Serial No. 780,457.

To all whom it may concern:

Be it known that I, GEORGE L. KELLEY, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Floor-Machines, of which the following is a specification.

This invention relates to machines for grinding, cleaning, finishing and polishing floors or other horizontal surfaces, and it comprises certain improvements in the construction of various parts of such a machine which facilitate the control of the machine, permit the grinding or polishing attachments to be rapidly and easily interchanged, increase the durability of the machine, simplify its construction and overcome the defects which have been present in the machines of this character heretofore produced.

In the accompanying drawings; Figure 1 is a side elevation of a machine embodying one form of the present invention. Fig. 2 is a similar view showing the handle clamped rigidly to the machine, a portion of the handle being broken away. Fig. 3 is a plan view, on an enlarged scale, of the head of the machine. Fig. 4 is a detail view, partly in section, showing the attachment of the handle to the yoke or bail. Fig. 5 is a perspective view of the grip portion of the handle and controlling switch. Fig. 6 is a vertical section through the head of the machine, on an enlarged scale, the driving motor being shown in elevation. Fig. 7 is a fragmentary sectional view on line VII—VII of Fig. 6. Fig. 8 is a bottom plan view of the central portion of the machine body, the brush or grinding attachment being removed and the attaching shaft therefor being shown in section. Fig. 9 is a side elevation of the machine with the long handle and bail removed, short handles being attached to enable the machine to be used conveniently upon tables or other elevated surfaces.

In the particular embodiment of the invention chosen for purposes of illustration, 1 is the body or casing of the machine upon which is mounted a motor 2 of any suitable type, preferably electric. Secured to the underside of the body or casing is the polishing, grinding or cleaning implement or attachment 3 which may be either a brush, as shown, or a sanding pad, grinder head or the like, and which, for convenience, will be here-

inafter designated simply as the attachment. The attachment is rotated by the motor 2 through suitable gearing. As shown in Fig. 6, the motor shaft carries a pinion 4 which meshes with a gear 5 to which is fixed a pinion 6 meshing with a gear 7. The latter is attached to a short shaft or journal 8, the end 9 of which projects from the bottom of the body 1 and to which the attachment is secured. As shown, this projecting end 9 is screwthreaded and the attachment has on its upper surface a plate 10 which screws thereupon. The gear 5 and pinion 6 may be supported in any suitable manner but are preferably journaled upon a shaft 11 supported in the casing at one side of the motor shaft and journal 8. This shaft 11 is preferably in the form of a large screw which passes through an opening in the bottom of the body or casing 1 and screws into an opening in the top of the casing. The gear 7 rests upon a central boss 12 projecting upwardly from the bottom of the body or casing, while the shaft or journal 8 rotates in a bearing 13 in the center of said boss. A suitable thrust bearing 14 is preferably located in an annular recess in the boss, the thrust plate 15 of said bearing being exposed at the bottom of the casing or body and being held in position in any suitable manner, as by means of screws 16. The plate 10 of the attachment is provided with an annular seat or rib 17 which engages the thrust plate 15 when the attachment is screwed on the projecting end 9 of the journal 8. By this construction it will be seen that the thrust of the attachment which is frequently unevenly distributed, is transmitted directly to the thrust bearing 14. The latter is preferably of substantial diameter and effectually relieves the shaft or journal 8 of lateral or bending stresses. At the same time the easy removal of the attachment so that it may be replaced by an attachment of a different nature is not interfered with as the thrust bearing, although engaged directly by the attachment, is entirely complete within itself independent of the attachment. The thrust bearing is tightly closed by the thrust plate so as to be practically dust proof and the body or casing of the machine is also tightly closed at all times so as to exclude dust and protect the gearing and bearings.

In order to facilitate the screwing or un-

screwing of the attachment upon or from the threaded stud 9, means are preferably provided for locking the gearing so as to hold the stud stationary. For this purpose any suitable mechanism may be employed, preferably a toothed lock 20 mounted to slide vertically in a slot 21 formed in the side of the machine body or casing and provided with a projecting knob 22 by which it may be moved either to bring its teeth 23 into engagement with the teeth of the gear 5 or to move it to inoperative position, as shown in Fig. 6. When the lock is engaged with the gear 5 it will be seen that the gearing is fixed, so that relative rotation of the machine and attachment by hand will result in the screwing or unscrewing of the brush or attachment upon the stud. The lock 20 preferably carries with it a slide or dust cover 24 which covers the slot 21 in the casing and excludes dust from the latter.

Any suitable arrangement may be utilized for lubricating the bearings of the apparatus but the following arrangement is satisfactory and is preferably employed: As shown, an oil cup or inlet valve 25 is attached to the top of the body or casing, this cup communicating with a passage 26 which opens into a groove 27 in the upper end of the shaft 11. This groove communicates with a hole 28 passing vertically through the shaft and having a branch 29 through which the lubricant reaches the outer bearing surface of the shaft. The lower end of the hole 28 discharges into an annular groove 30 in the shaft which communicates with a passage 31 leading to the bearing surface between the journal 8 and the bearing 13. No oil connection is ordinarily required to the thrust bearing 14 as the latter is preferably packed with a suitable solid lubricant.

For guiding the apparatus when used upon a floor, a long handle such as illustrated in Fig. 1 is preferably employed. This handle comprises a shank 40, with suitable grips 41 at its upper end and attached at its lower end to a yoke or bail 42, the arms of which are pivoted at 43 to the sides of the body or casing 1. The shank 40 is attached to the bail in any suitable manner, as by having formed at its lower end a square tapered projection 44 adapted to seat in a similarly shaped socket in the bail and to be drawn firmly into position by means of a nut 45 screwing on a threaded stud 46 projecting from the end of the tapered portion 44. The shank 40 is preferably made tubular, as shown, in which case the tapered projection 44 can be formed on a plug fitting into the end of the shank. An attachment for the electric circuit to supply the current for driving the motor 2 is preferably provided adjacent to the grips 41, as indicated at 47. A switch 48

is also preferably provided at this point so that the current may be switched on and off without removing the hands from the grips 41. The most satisfactory construction for the switch and grips is shown in Fig. 5. As here illustrated, the switch is of the push button type, provided with two push buttons 49, and the grips 41 are supported just above it by arms 50. With this arrangement the operator may operate the buttons with his thumbs without removing his hands from the grips. From the switch 48 a wire passes through the hollow shank 40 to a point near the lower end thereof, where it comes out, as indicated at 51, Fig. 1. One member of a detachable connector 52 is attached to this end of the wire, the other member of the connector being attached to a lead 53 for conducting the current to the motor 2. It is usually desirable to provide the bail or yoke 42 with a pivotal connection to the body or casing 1 but the movement of the bail at this connection is preferably controlled and limited so as to facilitate the guiding of the apparatus. In devices of this character, in which the attachment rotates about a vertical axis, it is possible to utilize the rotary movement of the attachment not only to produce the grinding or scouring action upon the floor or other surface but to propel the machine along the floor surface. This is accomplished by tipping the machine very slightly so as to cause the attachment to bear down more upon one side than the other. By tipping the machine in the proper manner it can be caused to travel in any desired direction. If the handle is pivoted to swing freely on the machine it is not possible to control this tipping action so as to secure the desired travel of the machine in any direction. On the other hand, if the handle is rigidly attached to the machine it is difficult to avoid tipping the machine too much and thereby interfering with the proper grinding or polishing action. These difficulties, however, are overcome with the present structure in which the handle is pivotally connected to the machine but its movements properly restricted. As shown, the arms of the bail or yoke project slightly beyond the pivots 43 by which they are secured to the sides of the body or casing 1, forming projections 55. Lugs 56 and 57 are formed on the body or casing above and below these projecting ends and serve to limit the pivotal movement of the bail. The extent of this movement can be adjusted by means of screws 58 carried by one pair of lugs, for instance, the lugs 57. If desired, all pivotal movement of the bail may be prevented by screwing up these screws as shown in Fig. 2. The pivotal movement of the bail within the limits allowed by the lugs 56 and 57 is,

however, preferably further controlled by means of suitable yielding connections between the bail and the body or casing of the machine. As shown, the projecting ends 55 of the bail carry springs 59, the free ends of which are gripped between the arms 60 of studs projecting from the sides of the casing. Thus it will be seen that the pivotal movement of the bail is resisted by the flexing of these springs, and when the handle is raised or lowered slightly, a certain pressure will be transmitted to the body of the machine through these springs. By this arrangement a very delicate control of the tilting movement of the machine may be secured and the machine may be guided in the desired direction with the greatest ease and accuracy. It will be understood that any other suitable arrangement for limiting and yieldably controlling the movement of the handle may be employed if desired.

In Fig. 9 is shown an arrangement by which the machine may be conveniently utilized for cleaning, grinding or polishing the tops of tables or other raised surfaces. As shown in this figure, the handle 40 and bail 42 have been removed, and handles 61 and 62 screwed into the sockets in the sides of the casing or machine body formerly occupied by the bail pivots 43. When the handle 40 is removed the parts of the separable connector 52 are disengaged and a corresponding connection is made from a switch 63 on the handle 61 to the connector member on the end of the lead 53.

I claim as my invention:

1. In a machine of the character described, the combination of a casing, a motor mounted on said casing, a rotary shaft mounted in said casing and having its lower end exposed at the bottom of said casing, the exposed lower end of said shaft having provision for the detachable connection therewith of an attachment, said casing having a bottom which is closed except where said shaft is exposed, a reduction gearing in the casing connecting said motor with said shaft, and a rotary attachment for operating upon a floor detachably secured to said exposed end of said rotary shaft, said attachment supporting said casing and motor when the machine is in use.

2. In a machine of the character described, the combination of a casing having a bottom provided with a central hole, a motor mounted on said casing, a rotary shaft mounted in the casing and having its lower end projecting through said central hole in the bottom of the casing and provided with a threaded portion for the detachable connection therewith of an attachment, the bottom of said casing being closed except at said central hole, reduction gearing in the casing connecting said motor with said shaft, and a rotary attachment for operat-

ing upon a floor detachably secured on the projecting lower end of said shaft, said attachment supporting said casing and motor when the machine is in use.

3. In a machine of the character described, the combination of a casing, a motor mounted thereon having a vertical shaft, a rotary attachment for operating upon a floor mounted at the bottom of said casing, a short shaft projecting through the bottom of said casing in line with said motor shaft and to which said attachment is secured, a vertical shaft mounted in said casing at one side of said motor shaft, and connections from said motor shaft to said short shaft comprising a pinion on said motor shaft, a spur gear journaled on said vertical shaft meshing with said pinion, a second pinion attached to said spur gear, and a spur gear on said short shaft meshing with said second pinion.

4. In a machine of the character described, a motor, a rotary attachment for operating upon a floor, inclosed reduction gearing between said motor and said attachment, and means for locking said gearing against rotation.

5. In a machine of the character described, the combination of a casing, a motor, a rotatable member mounted in the casing, reduction gearing in the casing connecting said motor to said rotatable member, a rotary attachment for operating upon a floor having screwthreaded engagement with said rotatable member, and a lock carried by the casing and movable into engagement with one of the members of said reduction gearing to lock the same and facilitate the screwing or unscrewing of said attachment.

6. In a machine of the character described, the combination with an attachment rotatable about a substantially vertical axis for operating upon a floor, of a machine head supported upon said attachment, a handle pivoted to said head to swing in a substantially vertical plane, and a yielding connection between said handle and head which yieldingly resists relative pivotal movement of said parts.

7. In a machine of the character described, the combination with an attachment rotatable about a substantially vertical axis for operating upon a floor, of a machine head supported upon said attachment, a handle pivoted to said head to swing in a substantially vertical plane, stops for limiting the pivotal movement of said handle, and a spring connection between said handle and said head which yieldingly resists the pivotal movement of the handle within the limits permitted by said stops.

8. In a machine of the character described, the combination with an attachment rotatable about a substantially vertical axis

for operating upon a floor, a machine head supported upon said attachment and including a motor for rotating the attachment, a handle having a bail pivoted to the machine head, stops for limiting the pivotal movement of said bail, and leaf springs projecting from said bail, the ends of said springs being attached to the machine head.

9. In a machine of the character described, the combination of a machine head carrying an attachment for operating upon a floor, said machine head including an electric motor for driving said attachment, a guiding handle secured to said machine head, a conductor for leading current to said

motor associated with said handle, said handle having a push button switch at its upper end, arms extending at each side of said switch beyond the same, and a transverse hand grip carried by said arms, the push buttons of said switch being in position to be operated by the operator without removing his hand from the grip.

Witness my hand, this 19th day of July, 1913.

GEORGE L. KELLEY.

Witnesses:

EDW. L. ELLIOTT,
F. E. PROCHNOW.