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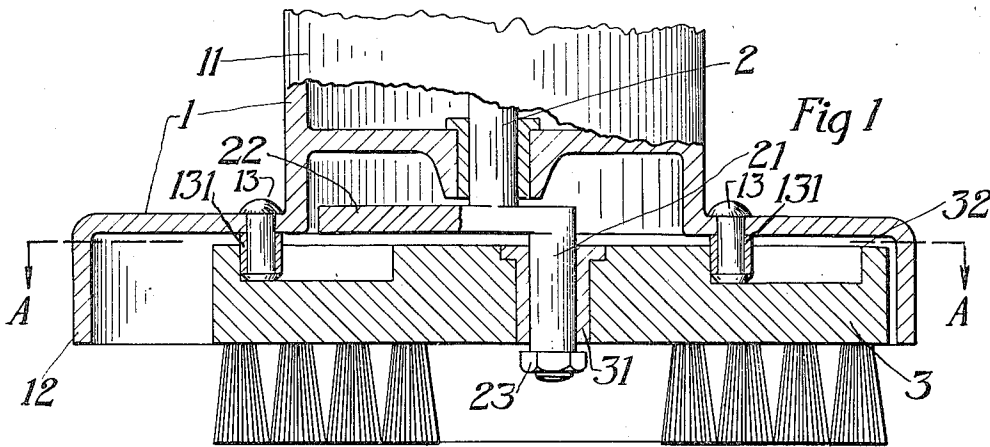
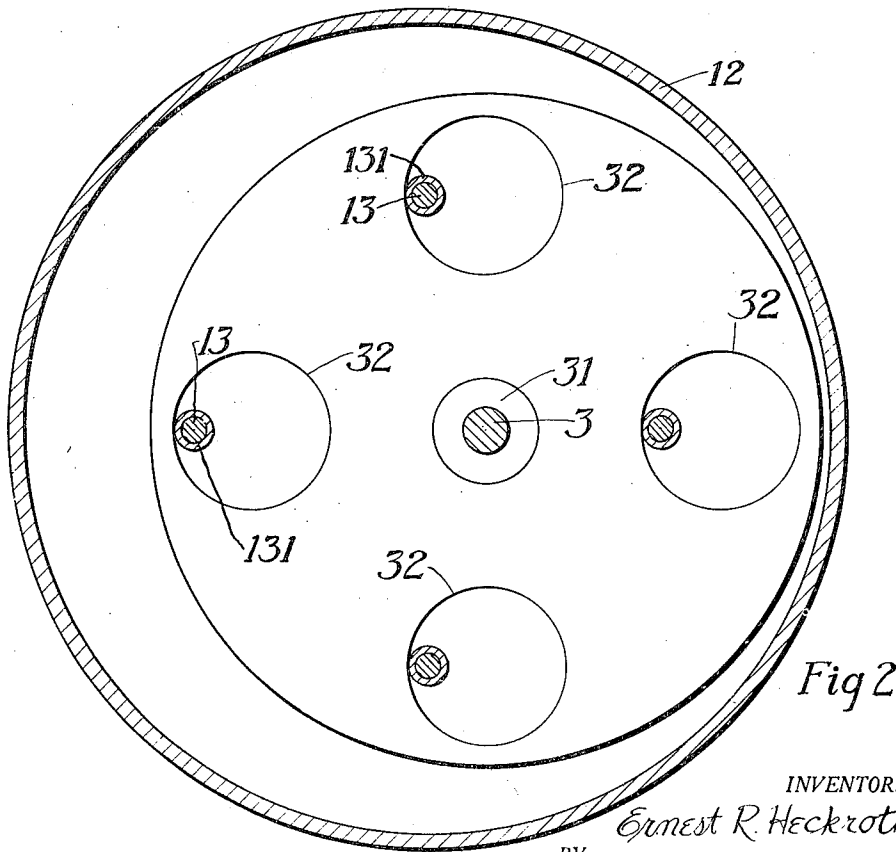
E. R. HECKROTH

2,023,588

POLISHING MACHINE

Filed June 24, 1933

4 Sheets-Sheet 1



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Dec. 10, 1935.

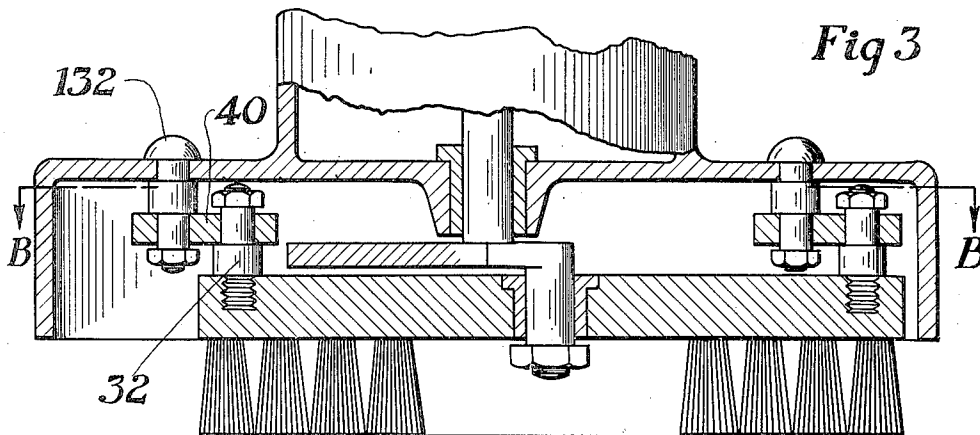
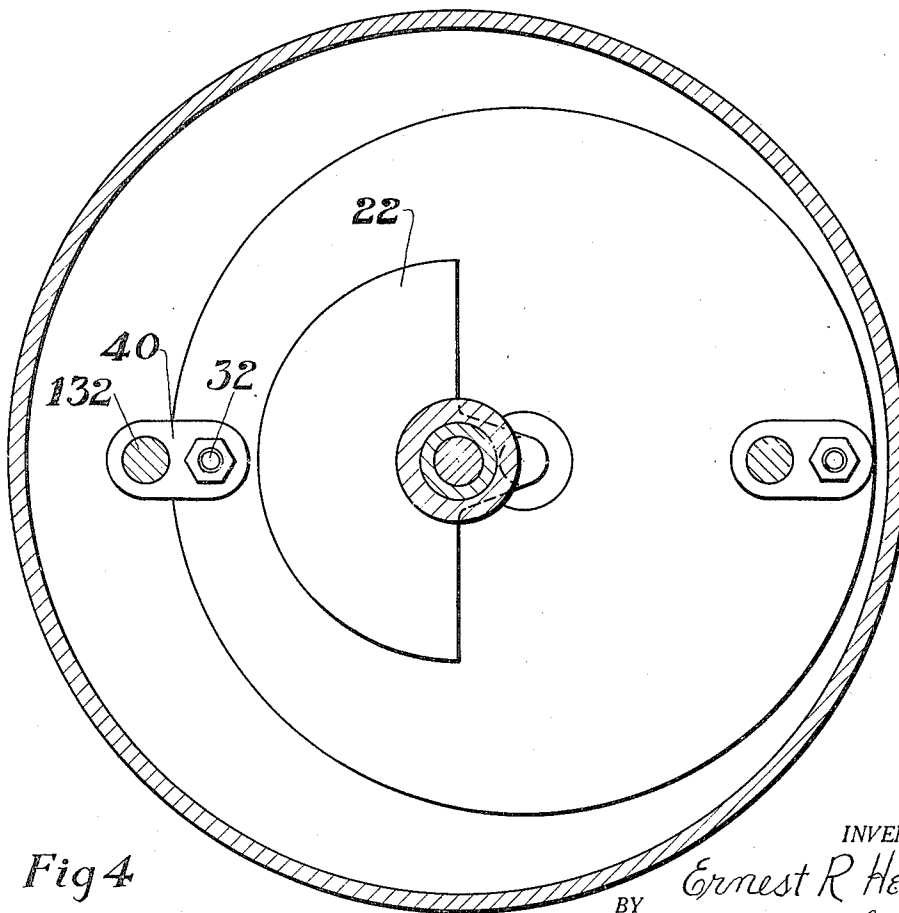
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4 Sheets-Sheet 2



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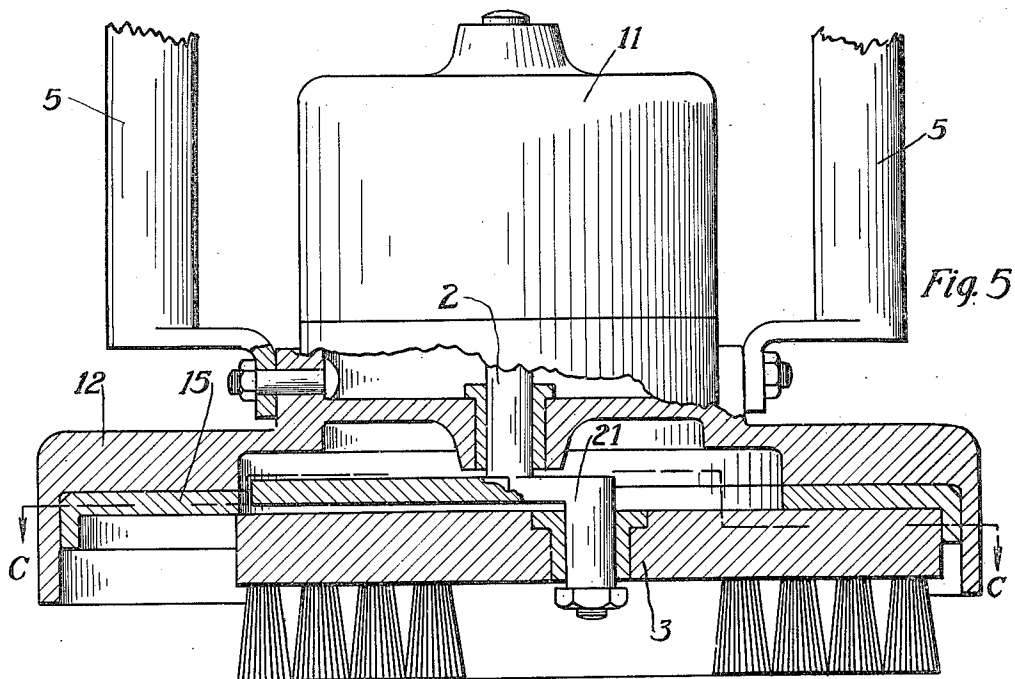
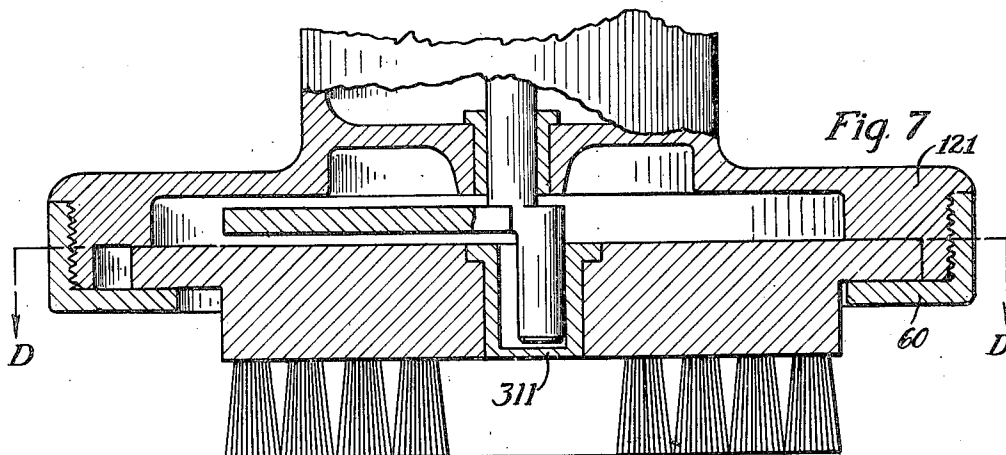
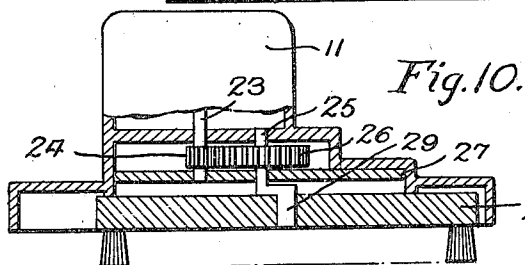
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4 Sheets-Sheet 3



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POLISHING MACHINE

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4 Sheets-Sheet 4

Fig 6

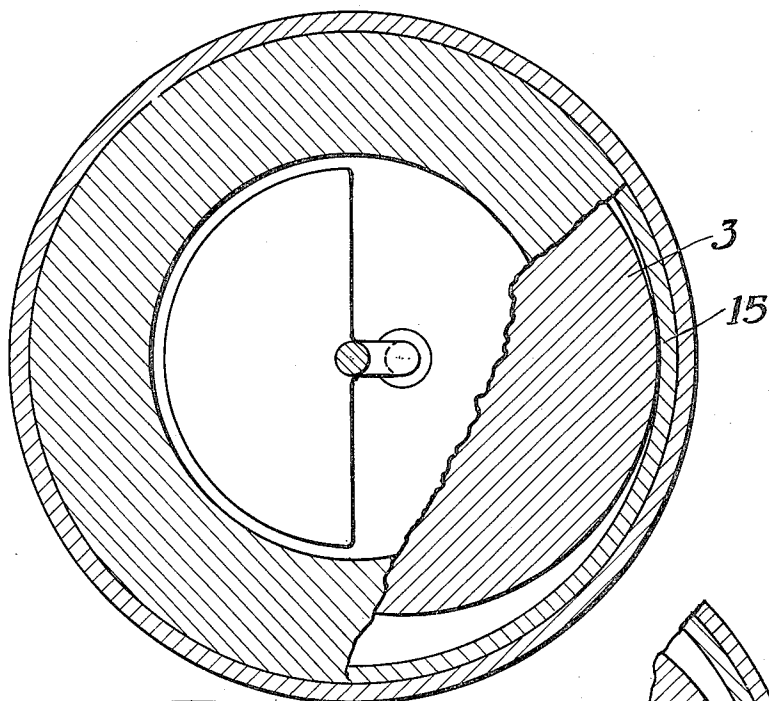


Fig 9

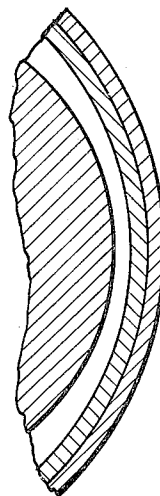
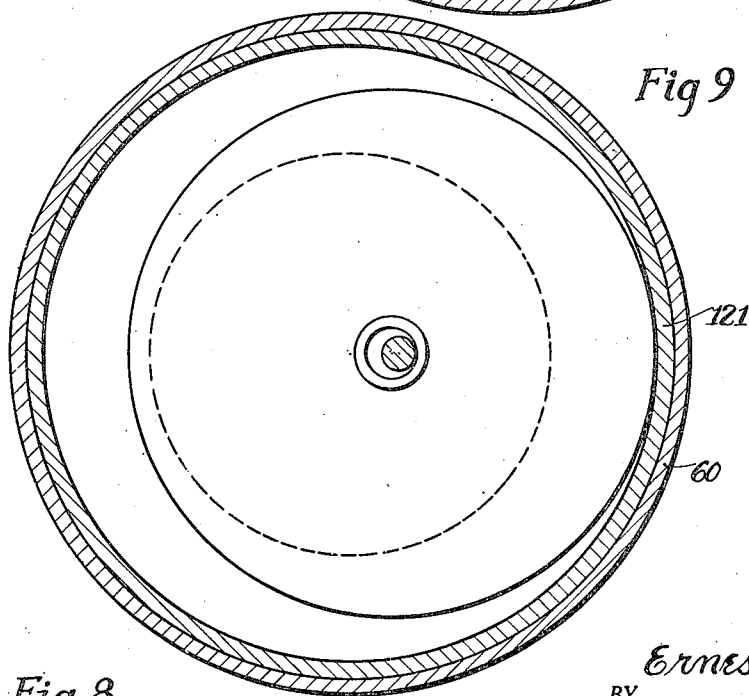


Fig 8



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UNITED STATES PATENT OFFICE

2,023,588

POLISHING MACHINE

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Application June 24, 1933, Serial No. 677,355

15 Claims. (Cl. 15—49)

This invention relates to a machine for grinding and polishing. The invention will be described in its application to a machine for polishing floors, but it is to be understood that the invention is not limited to this particular use.

Machines for polishing waxed floors and the like are described in the prior art. In most instances, however, these machines comprise a simple circular brush rotated, usually through speed reducing gearing, by an electric motor. The gearing is noisy and otherwise objectionable, the machine shortly tends to vibrate, its action becomes increasingly deficient as the wear of the brush increases, and the rotation of the brush about its center axis makes control difficult by tending to drive the machine in a particular direction. The multiple brush machines of prior art have similar defects.

In another form of prior art machine the brush is given reciprocating motion. These machines have not proved satisfactory because of increasing noise and vibration as toggle joints wear.

It is an object of this invention to provide a polishing and grinding machine free from the above difficulties, economical to manufacture, and which produces a more uniform finish on grained surfaces than can be produced with prior art machines.

The objects of the invention are accomplished, generally speaking, by a machine wherein the cutting, grinding, or polishing tool is given, by a crank, motion such that each point of the tool moves in its own, independent, closed path. The objects of the invention are accomplished, in one particular form, by giving the brush circular translatable motion. Specific means of accomplishing this result are illustrated in the drawings wherein:

Figure 1 is a view partly in section of one form of machine embodying my invention; Figure 2 is a view partly in section on line A—A of Figure 1; Figure 3 is a view partly in section through a different machine embodying my invention; Figure 4 is a view partly in section on line B—B of Figure 3; Figure 5 is a view partly in section through yet another machine embodying principles of my invention; Figure 6 is a sectional view on the line C—C of Figure 5; Figure 7 is a view partly in section of another machine embodying principles of my invention; Figure 8 is a cross section on the line D—D of Figure 7; Figure 9 is a fragmentary view showing a modification of the form of the invention shown in Figures 7 and 8; Figure 10 illustrates a modification

of the invention in which a gear is used to reduce the speed of the tool.

In the form of invention shown in Figure 1, 1 is a frame, in this instance comprising a dome-shaped portion 11 in which a motor is mounted, and a skirt 12; 2 is a crank shaft driven by the motor; 21 is a crank attached to and driven by the crank shaft; 22 is a counterweight to balance the weight of the crank and the brush; 3 is a brush; 31 is a bushing in the center of the brush in which crank 21 is mounted; 23 is a nut on the end of the crank providing for the dismantling of the brush; 13 are studs mounted in the frame; 131 are anti-friction sleeves on the studs; 32 are circular walls with which stud sleeves 131 make contact.

During the operation of this machine the motor, which is not shown in the drawings, turns the crank shaft 2, which rotates the crank 21 and imparts to the brush a rotary motion whose bounds are set by the contact of the studs with the walls of the annuli. By this arrangement each point on the brush moves in its own, independent, closed path. This motion, as produced by the apparatuses of Figures 1 and 3, is circular translatable motion.

In Figures 3 and 4 is illustrated a form of the invention very similar to that illustrated in Figures 1 and 2 differing therefrom in the manner of controlling the motion of the brush. In Figure 3, 132 is a stud mounted in the frame; 32 is a stud mounted in the brush; 40 is a link pivotally connected to each of the studs.

In the operation of this form of the invention the rotation of the brush is controlled by the studs and connecting links. The motion of the brush is similar to that of Figure 1.

In Figure 5, 11 is a portion of the frame housing the motor; 12 is the skirt portion of the frame; 2 is the crank shaft driven by the motor; 21 is the crank; 3 is the brush; 5—5 are the connections of the operating handle to the machine; 15 is a liner having a shoulder against which the rim of the brush 3 makes contact, that is to say that the brush is circular and of a size such that its rim touches the shoulder of the liner 15 at the point closest to the crank. In this way any point on the brush is given motion in its own closed path.

Figures 7 and 8 illustrate a form of the invention similar to that shown in Figures 5 and 6. In Figures 7 and 8 there is no liner, the side face of the bristle support making direct contact with the frame; a guard 60 is used to prevent dirt from getting into the mechanism of the machine

and to keep the brush in place. In this form of the invention a bushing 311 is larger than the bushing shown in the other forms of the invention and has a hole larger than the crank. The dimensions of the machine are made, however, so that the distance between a point on the shoulder and the edge of the crank in its nearest position is equal to the distance from the edge of the hole to the rim of the brush. The form of the invention shown in any figure can be driven through gearing if a reduction or increase of speed over the normal speed of the motor is deemed desirable.

It will be observed that in the forms of the invention disclosed in Figures 5 and 7 the brush base should be circular, but that in the other forms of the invention the shape of the brush is of minor importance.

Figure 9 illustrates the fact that certain advantages of the invention can be attained by the use of a brush drive, as shown in Figures 7 and 8, without having the brush base make contact with the wall of the casing or of the casing liner. In most cases, however, it is believed that the advantages of the invention are best obtained by the other forms of the invention. Figure 10 illustrates a modification of the invention in which a gear is used to change the speed of the tool to a speed different from that of the motor. In this form of the invention 11 is the motor casing; 23 is the armature of the motor or a shaft driven from the armature of the motor; 24 is a gear on the shaft 23; 25 is a crank mounted in the frame of the machine; 26 is a gear on the crank meshing with, and driven from, the gear 24; 29 is the crank portion of crank 25 on which is mounted the tool 28; 27 is a removable plate which serves to mount the crank and, optionally, the lower end of the drive shaft 23.

An advantage of my invention is that the rear of the brush is equalized. Another advantage of the invention is that rocking and bumping of the machine during operation are eliminated. Another advantage of the invention is that the machine is inexpensive to manufacture. Another advantage of the invention is that, when using a brush, abrasive, or other finishing tool on a grained surface, for instance on a wood surface, a more uniform finish is obtained. This will be understood from the fact that the outside edge of a turning tool makes a long sweep with the grain of the wood and a long sweep across the grain, while the inside edge of the tool makes very short sweeps with and across the grain, making it impossible to get a uniform finish. With my invention all portions of the tool act identically on the treated surface.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that I do not limit myself to the specific embodiments thereof except as defined in the appended claims.

I claim:

1. In a surface working machine a brush, a frame, a motor, a crank pivotally connecting the brush to the motor for operation thereby, a handle on the frame, and means cooperating with the brush and frame to confine the motion of the brush to a circular translatable path, the arrangement of parts being such that in operative position weight of the machine may be carried by the brush.

2. In a polishing machine a frame having a motor casing and a skirt, a motor within the cas-

ing, a crank within the skirt driven from the motor, a tool attached to the crank by a pivotal connection, and studs on the frame and tool connected by a link cooperating to constrain each point on the tool to travel in an independent, closed path.

3. In a polishing machine a frame having a motor casing and a skirt, a motor within the casing, a crank within the skirt driven from the motor, a tool having a circular edge, said tool being attached to the crank by a loose mounting and a cooperating circular interior to the skirt whereby to permit the rim of the tool to contact the interior of the skirt and to give the tool the motion of an internal ring gear, and the radius of the tool being greater than the length of the crank.

4. In a polishing machine a frame, a motor on the frame, a crank driven from the motor, a surface-treating tool attached to the crank and having a circular rim, circular means on the frame, the connection between the crank and the tool being such that the rim of the tool makes contact as a circular ring gear with the circular portion of the frame whereby the tool derives motion both from the rotary motion of the crank and from contact with the said circular member, and the radius of the tool being greater than the length of the crank.

5. In a surface working machine a surface treating tool and mounted thereabove a frame and a motor, a crank pivotally connecting the brush to the motor for operation thereby, and means on the frame cooperating with means on the tool to confine the tool to translatable motion in a closed path.

6. In a surface working machine a surface treating tool and mounted thereabove a motor having revolvable and stable parts, a crank pivotally connecting the brush to the motor for operation thereby, and means on a non-rotary portion of the machine cooperating with means on the tool to confine the tool to translatable motion in a closed path.

7. In a polishing machine a frame having a skirt, a motor mounted on the frame, a crank within the skirt rotatable by the motor, a brush pivotally mounted on the crank and projecting beyond the said skirt, and studs attached to the frame cooperating with walls on the brush to confine the motion of the brush to circular translatable motion.

8. In a surface working machine a surface treating tool, a motor having revolvable and stable parts mounted thereon by pivotal means comprising a crank, and means on a stable part of the machine cooperating with means on the tool to confine the tool to translatable motion in a closed path.

9. In a polishing machine a frame having a skirt and a motor housing, a motor mounted in the housing, a counterweighted crank rotatable by the motor, a brush pivotally mounted on the crank encircled by the skirt and projecting beyond the said skirt, circular holes in the brush, studs attached to the frame and projecting within the holes whereby to confine the motion of the brush to a circular translatable path, the axis of the cooperating studs and holes being substantially parallel to the axis of the brush mounting.

10. In a polishing machine a frame, a motor mounted on the frame, a crank rotatable by the motor, a brush operably, pivotally attached to the crank, circular walls carried by the back of the brush, and studs attached to the frame pro-

jecting within the circular walls whereby to constrain the brush to travel with circular translatory motion.

11. In a polishing machine a frame having a skirt, a motor carried by the frame concentric to the skirt, a crank encircled by the skirt and driven by the motor, a brush pivotally mounted on the crank and a plurality of means on the brush operably connected to a plurality of means on the frame whereby each said means on the brush is caused to travel in a circular path about the cooperating means on the frame.

12. In a polishing machine a frame member, a motor carried by the frame, a crank driven by the motor, a brush member pivotally connected to the crank, and a plurality of studs on one said member operably connected to a plurality of means on the other said member whereby the brush is caused to travel in a circular translatory path.

13. In a polishing machine a frame member, a motor carried by the frame, a crank driven by the motor, a tool operably and pivotally attached to the crank, and a plurality of studs on

one said member operably connected to a plurality of studs on the other said member whereby the tool is caused to travel in a circular translatory path.

14. In a surface treating machine a frame, a motor carried thereby, a crank rotatable by the motor, a tool operably pivotally connected to the crank, and means on the frame cooperating with means on the tool to confine the motion of the tool to a translatory closed path.

15. In a surface-working machine a frame, a motor carried thereby, a crank rotatable by the motor, a substantially circular tool having a radius greater than the length of the crank operatively connected to the crank by a pivotal connection whereby to give a portion of the tool motion about a point on the frame, and means on the frame cooperating with means on the tool to constrain all portions of the tool to act with equal intensity upon the surface, the arrangement of parts being such that in operative position weight of the machine may be supported by the tool.

ERNEST R. HECKROTH.

CERTIFICATE OF CORRECTION.

Patent No. 2,023,588.

December 10, 1935.

ERNEST R. HECKROTH.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 40, for "rear" read wear; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 21st day of January, A. D. 1936.

Leslie Frazer

(Seal)

Acting Commissioner of Patents.