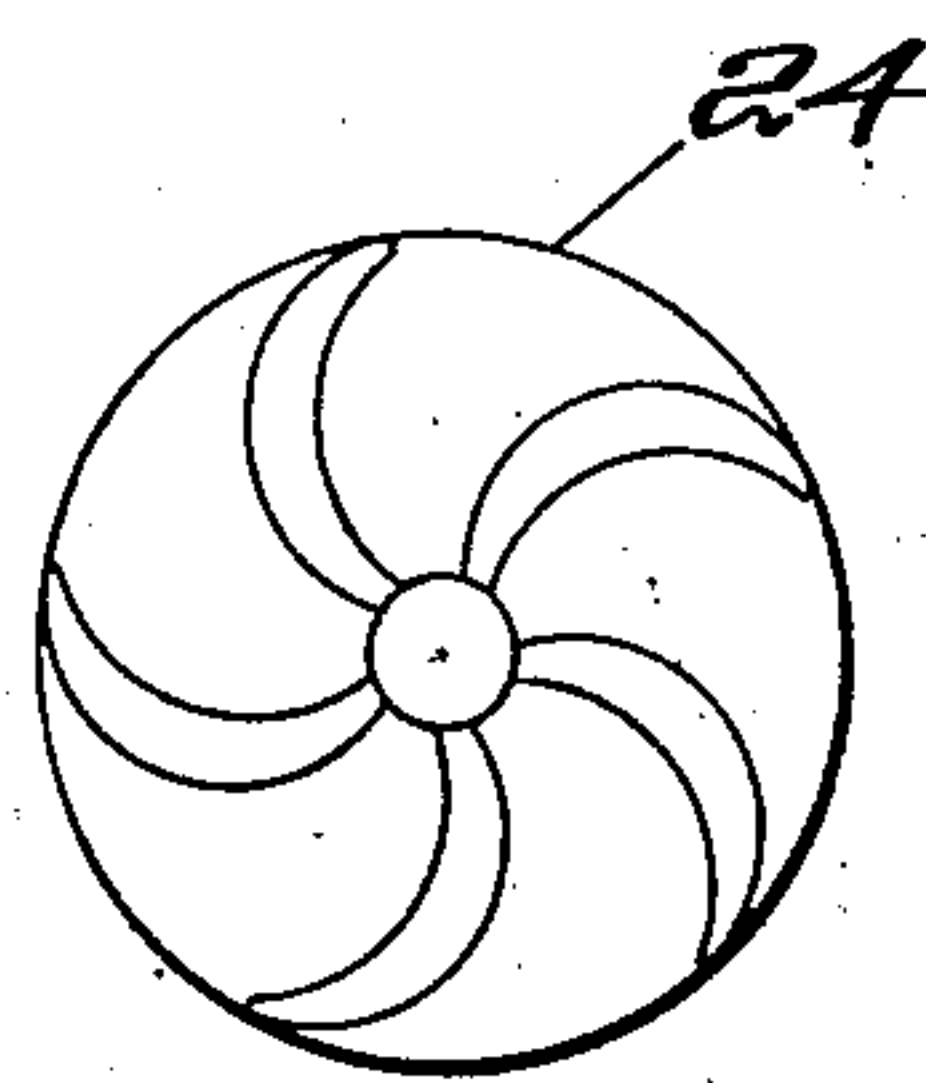
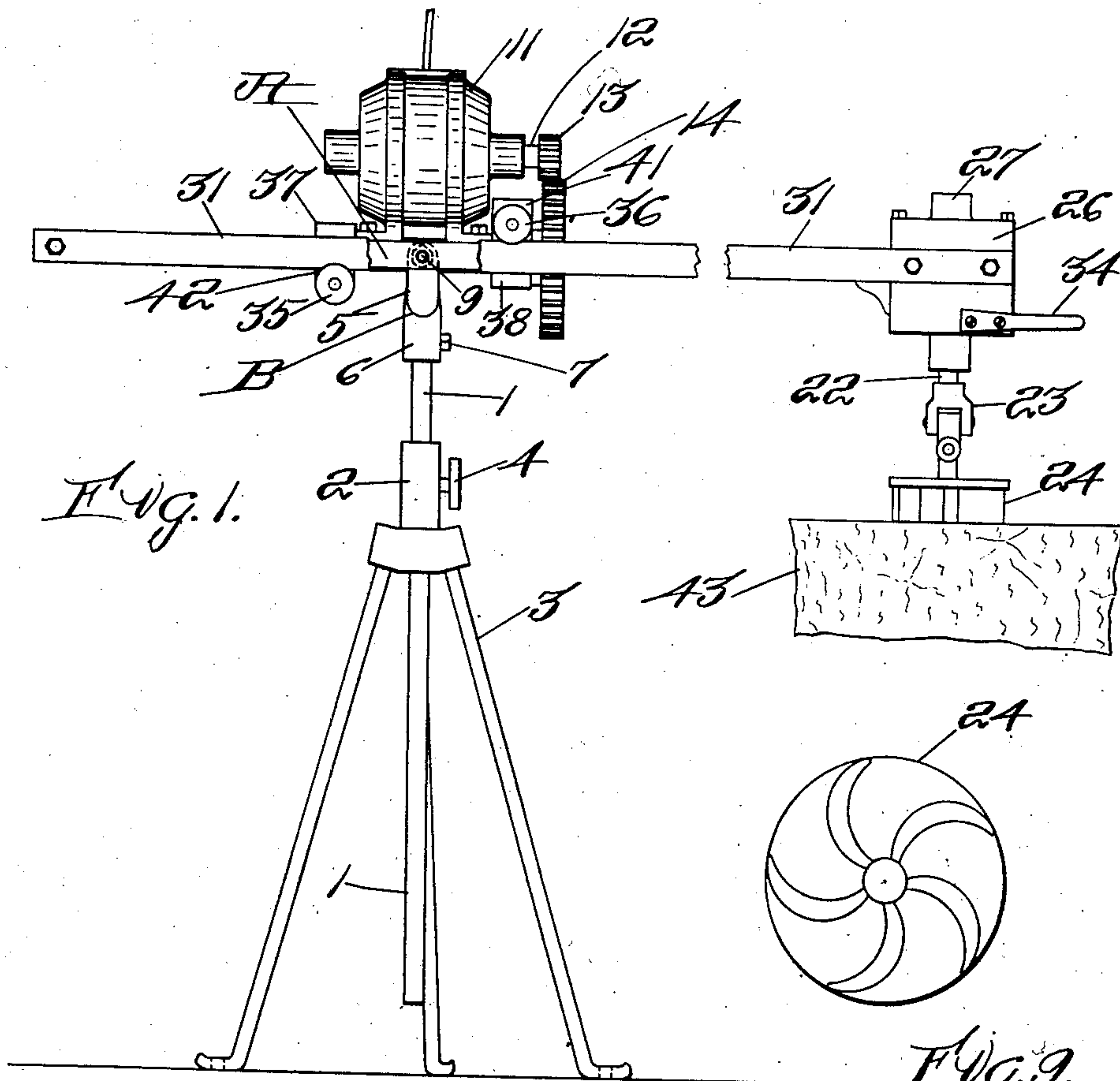
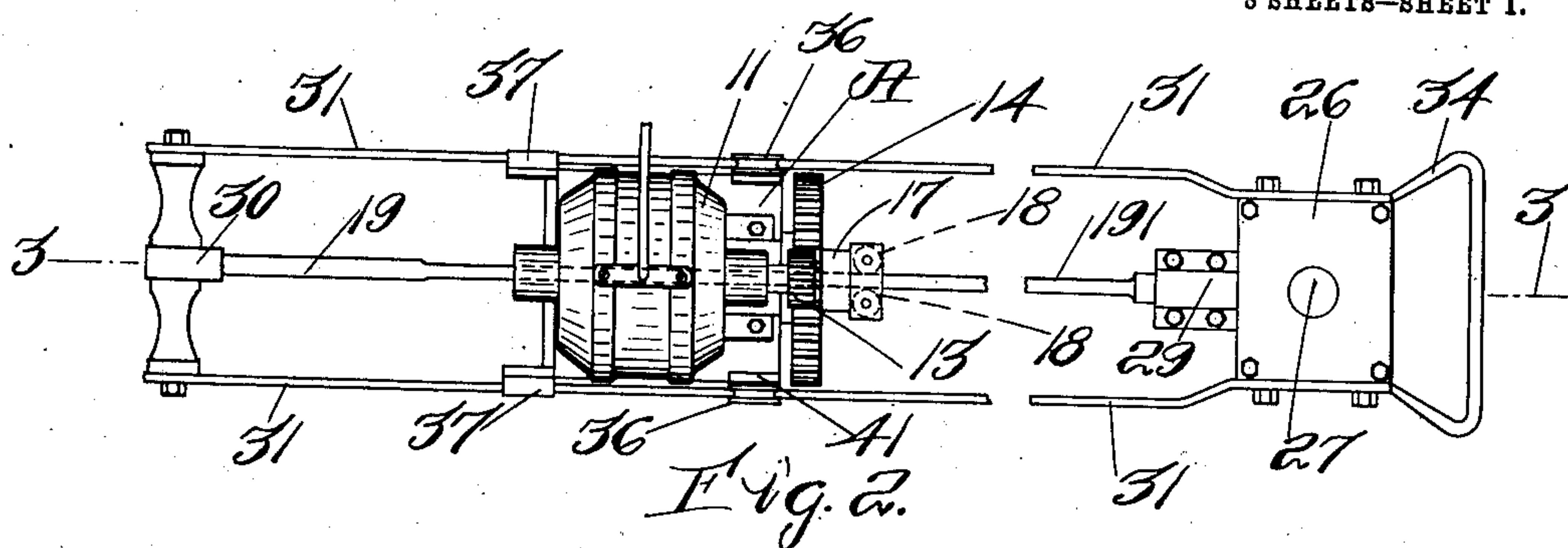


E. CAVICCHI.  
POLISHING MACHINE.  
APPLICATION FILED FEB. 18, 1909.

931,383.

Patented Aug. 17, 1909.

3 SHEETS—SHEET 1.



Witnesses:  
John H. Parker  
Alice Jarr

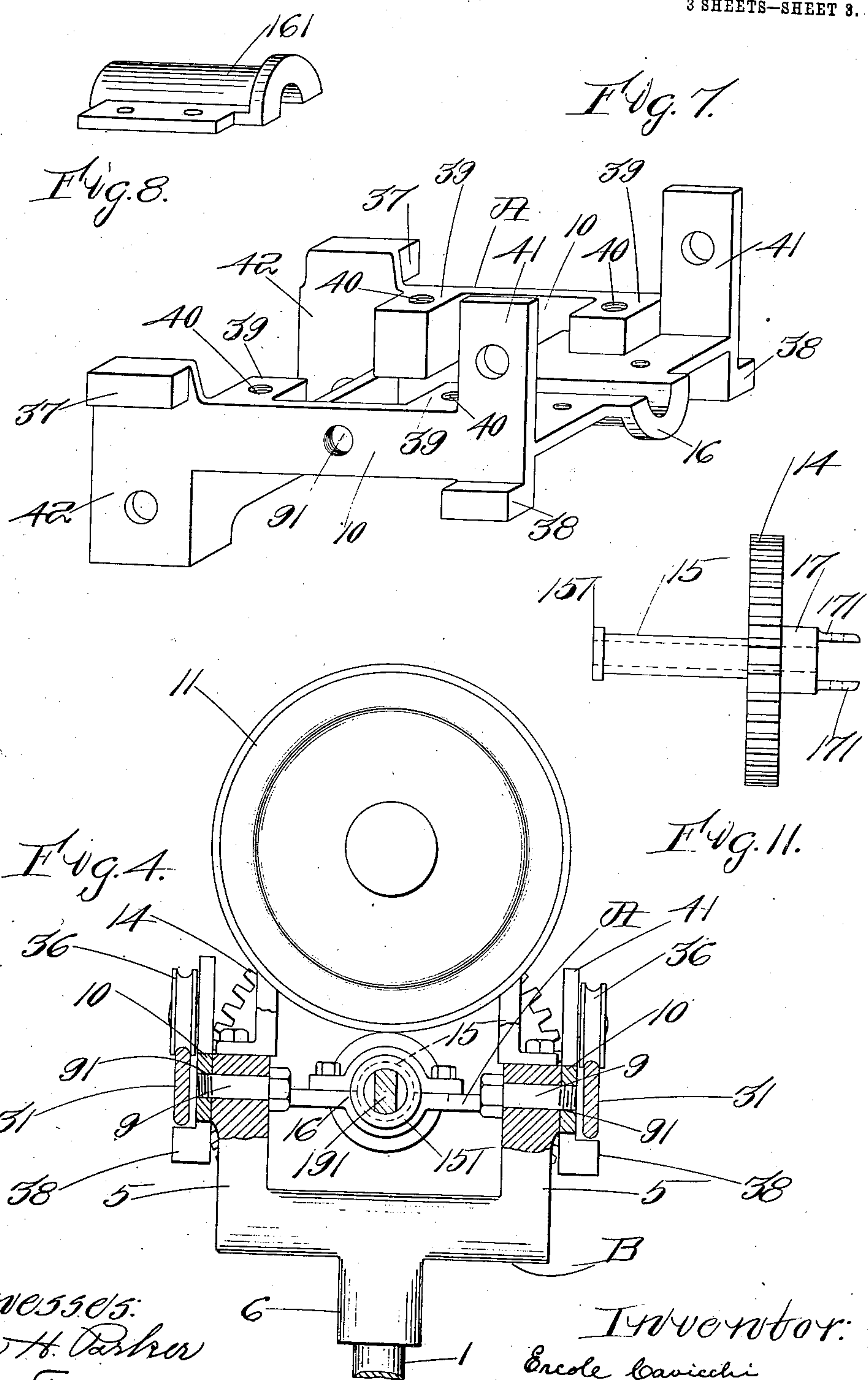
Inventor:  
Ercole Cavicchi  
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Attorneys.



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Enrico Cavicchi  
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# UNITED STATES PATENT OFFICE.

ERCOLE CAVICCHI, OF QUINCY, MASSACHUSETTS.

## POLISHING-MACHINE.

No. 931,383.

Specification of Letters Patent.

Patented Aug. 17, 1909.

Application filed February 18, 1909. Serial No. 478,535.

To all whom it may concern:

Be it known that I, ERCOLE CAVICCHI, citizen of the United States, residing at Quincy, in the county of Norfolk and State of Massachusetts, have invented a certain new and useful Improvement in Polishing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 The invention relates to an improvement in polishing machines especially intended for use in polishing stone but which is adapted for use in polishing other material than stone.

15 The main object of the invention is to provide a polishing machine mounted on a portable support whereby the apparatus as a whole may be moved from one point to another as desired and also when the support is placed in any position desired, the polishing tool may be moved in any direction in any plane without moving the main support on which the apparatus is mounted.

25 Other objects of the invention will appear more fully hereinafter set forth.

In carrying out my invention I provide a motor mounted upon a suitable base which in turn is mounted upon a suitable portable standard in a manner whereby the base has both a rocking and a swiveling movement with relation to the standard, that is, it has a universal movement, and I also provide a carriage also supported by said base which is movable longitudinally with relation to said base while supported by it, and said carriage carries the tool-holder and the driving mechanism for the tool, said tool-holder being capable of universal movement independently of the movement of the carriage or of the base.

45 The invention will be fully understood from the following description taken in connection with the accompanying drawings, and the novel features are pointed out and clearly defined in the claims at the close of the specification.

In the drawings,—Figure 1 is an elevational view of a stone polishing machine. 50 Fig. 2 is a plan view thereof. Fig. 3 is an enlarged sectional view on line 3—3 of Fig. 2. Fig. 4 is a section on line 4—4 of Fig. 3. Fig. 5 is an enlarged section on line 5—5 of Fig. 3. Fig. 6 is an enlarged section on line 6—6 of Fig. 3. Fig. 7 is a detail view

of the base which supports the motor. Fig. 8 is a detail view of cap therefor. Fig. 9 is a view of the face of the tool. Fig. 10 is section on line 10—10 of Fig. 5. Fig. 11 is a detail view of the gear wheel with hubs. 60

In the form of construction shown in the drawings, the base A which supports the motor and carriage is pivotally connected with a cross head or fork B which is mounted by a swivel connection on a rod or standard 1 which is adjustably connected with a socket 2 of a portable stand, such for instance as the tripod 3. The standard 1 which passes through the socket 2 is adjustable vertically and may be clamped in any adjusted position by the set screw 4. 70

The swivel connection of the fork B with the rod 1 is shown in Fig. 3. The fork B is provided with two upright arms 5, 5, (see Fig. 4) and with a hollow stem 6 in which the standard 1 turns, being secured therein by a screw 7 which passes through a hole in the side of the stem 6 and engages with a circumferential groove 8 in the rod 1. 75

The base A is connected with the fork B 80 by the two pivot pins 9, 9, (see Fig. 4) which pass through holes 91 in the sides 10, 10, of the base A in such manner as to allow a tilting motion of the base on the fork B.

Mounted upon the base A also is a motor 85 11 which, in the form shown in the drawings, is an electric motor. The motor 11 is provided with a shaft 12 carrying thereon a pinion 13 which engages with a gear 14 having projecting from one side thereof a long hollow hub 15 which is seated in the box 16 of the base A. The hub 15 is formed with an annular flange 151 on the outer end against which the end of the box 16 abuts to prevent longitudinal movement of the hub in the box. Projecting from the other side of the gear 14 is a slotted hollow hub 17 having pivoted to the ears 171 thereof the rollers 18, 18. 95

Passing through the two hubs 15, 17, and 100 through the gear 14 is a shaft 19 carrying on its forward end a bevel gear 20 which engages with a bevel gear 21 mounted on the shaft 22 to the lower end of which is connected a fork 23 which has a swivel joint 105 connection with the polishing tool 24. The bevel gear 21 is provided with a hollow hub 25 through which the shaft 22 passes and which rests upon the bottom of the case 26 in which the gears 20 21 are inclosed. The 110



upper end of the shaft 22 is journaled in a bearing 27 at the upper end of the case 26 and the case is thereby supported by the shaft. The hub 25 is loosely splined to the shaft 22 as by a spline 221 in such manner that when the gear 21 revolves, the shaft 22 must also revolve, but the shaft 22 may have a longitudinal movement with relation to the hub and gear.

10 A washer 28 is provided on the upper end of the shaft 22 between the shaft and the bearings. The object of having the shaft 22 capable of a slight longitudinal movement within the hub 25 is to allow for the wear.

15 The shaft 19 is formed with a flattened portion 191 throughout a portion of its length as clearly shown in Fig. 2, said flattened portion passing between the rollers 18, 18, and through the gear 14 and its hubs 15, 20 17 whereby the shaft while being capable of longitudinal movement will also revolve with the gear 14. It is flattened on both sides for such portion of its length as will permit the desired range of longitudinal or sliding movement of the shaft while still partaking of a rotary movement.

The rear end of the shaft is circular in cross section and is supported and has its bearing in the cross-piece 30 with which the track bars 31, 31, hereinafter to be explained are connected. The forward end of the shaft 19 passes through the box 29 into the case 26 and as already stated carries on its forward end the bevel gear 20. The rollers 35 18 are preferably provided with roller bearings 32 between the rollers 18 and the pins 33 on which they are mounted.

The track bars 31 are secured at their rear ends to the cross-piece 30 and are secured at their forward ends to the sides of the case 26 to which also is secured a handle 34 whereby the track bars, the case and the polishing tool may be moved back and forth or in any desired direction.

45 The track bars pass between suitable supports and anti-friction devices whereby the track bars may be properly supported and permitted to be moved back and forth. The preferred form of supports and anti-friction devices are as follows: Each track bar is supported by and passes between two rollers 50 35, 36, one on the under and the other on the upper side, and two blocks 37, 38, one on the upper and the other on the under side, so disposed that one of the blocks comes over one of the rollers and the other roller comes over the other block. These blocks and rollers are all mounted upon the base A. By means of the handle 34 the case 26 and the track bars 31 may be moved back and forth upon the base A so that the polishing tool may be given a forward and back movement. The entire base A may also be rocked on its pivot pins 9, 9, by reason of the pivotal connection of the base with the fork B on the

horizontal pivots 9, 9, and thereby the track bars and the polishing apparatus may be given a rocking movement in a vertical plane and by reason of the swivel fork 6 the apparatus may be swiveled upon the rod 1 70 so as to give a lateral sweeping movement in a horizontal plane. The lower part of the box 16 through which the shaft 19 passes is preferably cast as an integral portion of the base A and is provided with a separable 75 upper portion or cover 161 which may be bolted to the under portion 16 after the shaft is set in position.

The base A is formed with four blocks or lugs 39, 39, 39, 39, for the feet of the motor 80 to rest upon and to which the motor is fastened by screws entering the screw holes 40 in the blocks 39. The roller 36 is pivoted to an ear 41 projecting upward from and formed integral with the base A and the 85 roller 35 is pivoted in an ear 42 extending downwardly from and integral with the base A.

In operation, the tool 24 will rest on the surface of the stone 43 which is being polished, and may be moved back and forth 90 or laterally over the surface of the stone by the handle 34, by the movement of the track bars and the swiveling movement of the base. Any slight inequalities in the surface 95 will be allowed for by the universal joint connection of the tool 24 with the shaft 22, and any considerable variation in the level of the stone is provided for by the pivot connection of the base A with the standard 100 by the pins 9, 9. In order to adjust the apparatus for stones of different height, the standard 1 may be raised or lowered and clamped in its adjusted position by the set screw 4.

105 While I have shown an electric motor in connection with my apparatus I do not intend to limit myself to the use of an electric motor. Any suitable power driven motor may be employed. It is also obvious that 110 while I have described the invention as especially intended for polishing apparatus some other kind of a tool than a polishing tool may be connected with and operated by the driving mechanism, and it is my purpose to have the claims cover such use. 115

What I claim is:

1. In a polishing machine, a mount, a portable standard on which said mount is supported, a universal joint connection between said mount and said standard whereby the mount is adapted to be rotated on a vertical axis and rocked on a horizontal axis, a motor supported on said mount, a reciprocable carriage supported on said mount, and reciprocable with relation thereto, a rotary shaft secured to said carriage, driving mechanism connecting said motor with said shaft whereby said shaft is rotated, a second rotary shaft having driving connection 130



tion with said first mentioned rotary shaft, and means whereby a tool may be connected with said second shaft and operated thereby.

2. In a stone polishing machine, a mount, a portable standard on which said mount is supported, a universal joint connection between said mount and said standard, whereby the mount is adapted to be rotated on a vertical axis and to be rocked on a horizontal axis, a motor supported on said mount, a reciprocable carriage supported on said mount, and reciprocable with relation thereto, a rotary shaft secured to said carriage, driving mechanism connecting said motor with said shaft whereby said shaft is rotated, said carriage and shaft being movable longitudinally with relation to the driving mechanism, a rotary shaft having driving connection with said first mentioned rotary shaft, a tool and a universal joint connection between said tool and said second shaft.

3. In a polishing machine, a mount, a portable standard for said mount, a universal joint connection between said mount and said standard, whereby said mount is adapted to be rotated on a vertical axis and rocked on a horizontal axis, a motor, a reciprocable carriage supported on said mount, a tool, a holder therefor, a universal joint connection between said tool and said tool holder, means whereby said tool holder is connected with said carriage and driving mechanism connecting said motor with said tool holder.

4. In a polishing machine, a mount, a portable standard for said mount, a universal joint connection between said mount and said standard, a motor supported on said mount, a reciprocable carriage on said mount and movable with relation thereto, a tool, a holder therefor, a driving shaft having driving connection with said tool holder, said driving shaft being mounted on said carriage and movable longitudinally therewith, and driving connection between said shaft and said motor whereby said shaft may be rotated independently of its longitudinal reciprocable movement.

5. In a polishing machine, a mount, a portable standard for said mount, a universal joint connection between said mount and said standard, a motor, a reciprocable carriage on said mount and movable with relation thereto, a polishing tool, a holder therefor, a driving shaft having driving connection with said tool holder, said driving shaft being mounted on said carriage and movable longitudinally therewith, said driving shaft being rotatable independently of the movement of said carriage and having a portion intermediate its ends non-circular in cross section, a driving wheel loosely mounted on said non-circular portion of said shaft, said driving wheel having a hub with a non-circular passage through which

the non-circular portion of the shaft extends, whereby the shaft is caused to rotate with said driving wheel and is longitudinally movable with relation thereto and driving mechanism connecting said driving wheel with said motor.

6. In a polishing machine, a mount, a portable standard for said mount, a universal joint connection between said mount and said standard, a motor, a reciprocable carriage supported on said mount, a rotatable shaft journaled in said carriage, said shaft having a portion of its length non-circular in cross-section, a driving wheel loosely mounted on the non-circular portion of said shaft whereby said driving shaft is longitudinally movable through said driving wheel and a slotted hub projecting from one side of said driving wheel having a non-circular passage through which said non-circular portion of the shaft passes whereby the rotary movement of said wheel is imparted to said shaft, driving mechanism connecting said wheel with said motor, a rotary tool holder and driving mechanism connecting said tool holder with said shaft.

7. In a polishing machine, a mount, a standard for said mount, a universal joint connection between said mount and said standard, a motor, a reciprocable carriage supported on said mount, a rotatable shaft having its bearings in said carriage, said shaft having a portion of its length non-circular in cross section, a driving wheel loosely mounted on the non-circular portion of said shaft whereby said driving shaft is longitudinally movable through said driving wheel, a slotted hub projecting from one side of said driving wheel having a non-circular passage through which said non-circular portion of the shaft passes whereby the rotary movement of said wheel is imparted to said shaft, driving mechanism connecting said wheel with said motor, a rotary tool holder, a rotary shaft connected therewith, said second rotary shaft being at right angles with said first mentioned shaft, gear connection between said shafts, a case for said gear connections, said case being supported by said carriage and movable therewith.

8. In a polishing machine, a mount, a cross head to which said mount is pivoted on horizontal pivots whereby the mount is capable of a rocking movement in a vertical plane, a standard on which said cross head is mounted and having a swivel connection therewith whereby said cross head is rotatable on a vertical axis in a horizontal plane, means for vertically adjusting said cross head to varying elevations, a carriage supported on said mount and reciprocable thereon, a rotary shaft journaled in said carriage and movable longitudinally therewith, means for rotating said shaft independently



of the movement of the carriage, a tool, means for supporting said tool connected with said carriage whereby the tool is movable with the carriage, and driving mechanism connecting said tool with said rotary shaft.

9. In a polishing machine, a base, a portable standard for said base, a motor, a reciprocable carriage comprising two parallel track bars rigidly connected together supported on said base, each of said track bars having two supports on both its upper and under side, one of said upper supports being a lug projecting from the said base and the other upper support being an anti-friction roller journaled in said base, the under supports of each of said track bars being an anti-friction roller journaled in said base and a lug projecting from said base said base being formed with lugs on which said motor is supported, a driving shaft journaled in said carriage and movable therewith, and rotatable independently thereof, said base being formed with a box through which said shaft passes, driving mechanism connecting said motor with said driving shaft and a tool operatively connected with said shaft.

10. In a polishing machine, a mount, a standard for said mount, a universal joint connection between said mount and said standard, means for adjusting said standard to different elevations, a motor supported on said mount, a reciprocable carriage on said mount and movable with relation thereto, a tool, a holder therefor, a driving shaft having driving connection with said tool holder, said driving shaft being mounted on said carriage and movable longitudinally therewith and driving connection between said shaft and said motor whereby said shaft may be rotated independently of its longitudinal reciprocable movement.

11. In a polishing machine, a base to support the driving mechanism, said base having bearings whereby it is adapted to be pivotally connected with a standard and having lugs adapted to support a motor, two upwardly projecting ears on opposite sides of said base having outwardly projecting rollers pivoted thereto and two outwardly projecting blocks below said rollers with a space between each of said rollers and its companion block for the passage of a track bar, two downwardly projecting ears on opposite sides of said base having outwardly projecting rollers journaled therein, two outwardly projecting lugs above said last mentioned set of rollers with a space between each lug and its companion roller adapted for the passage of a track bar, said rollers and blocks on each side of the base being so positioned with relation to each other as to provide both a roller and a block support for the under side of a track bar on

each side of the base and a block and a roller support for the upper side of each of said track bars.

12. In a polishing machine, a base for the support of the driving mechanism, said base having bearings whereby it is adapted to be pivotally connected with a standard and having lugs adapted to support a motor, two upwardly projecting ears on opposite sides of said base having outwardly projecting rollers pivoted thereto and two outwardly projecting blocks below said rollers with a space between each of said rollers and its companion block for the passage of a track bar, two downwardly projecting ears on opposite sides of said base having outwardly projecting rollers journaled therein, two outwardly projecting lugs above said last mentioned set of rollers with a space between each lug and its companion roller adapted for the passage of a track bar, said rollers and blocks on each side of the base being so positioned with relation to each other as to provide both a roller and a block support for the under side of a track bar on each side of the base and a block and a roller support for the upper side of said track bars, a portion of said base between its two opposite sides being formed with a trough portion curved in cross section adapted to serve as a box for a shaft.

13. In a polishing machine, a base, a standard therefor, two parallel track bars, anti-friction supports carried by said base on which said track bars are supported, said track bars being reciprocable on said supports with relation to said base, a rotatable shaft connected with said track bars and reciprocable therewith independently of its rotary movement, means for rotating said shaft and means for operatively connecting a tool with said rotary shaft.

14. In a polishing machine, a base, a standard therefor, two parallel track bars, anti-friction supports carried by said base on which said track bars are supported, said track bars being reciprocable on said supports with relation to said base, a rotatable shaft connected with said track bars and reciprocable therewith independently of its rotary movement, means for rotating said shaft, a tool holder and a support therefor carried by said track bars and driving mechanism for the tool holder operatively connecting the tool holder and said rotary shaft.

15. In a polishing machine, a reciprocable carriage, a support for said carriage having ways on which said carriage moves, a rotary shaft journaled to and carried by said carriage independently of its rotary movement, said shaft having a non-circular portion, a gear wheel loosely mounted on said non-circular portion and having a slotted hollow hub through which the non-circular portion of the shaft passes, two anti-friction rollers



5 journaled in said slotted hub having a space between them between which the said non-circular portion of the shaft passes, said shaft being reciprocable between said rollers and having flattened faces engaged by said rollers whereby rotary movement of said gear wheel is communicated to said shaft.

10 16. In a polishing machine, a reciprocable carriage, a support for said carriage having ways on which said carriage moves, a rotary shaft journaled to and carried by said carriage independently of its rotary movement, said shaft having a non-circular portion, a gear wheel loosely mounted on said non-circular portion and having a slotted hollow hub through which the non-circular portion of the shaft passes, two anti-friction rollers journaled in said slotted hub having a space between them between which the said non-circular portion of the shaft passes, said shaft being reciprocable between said rollers and having flattened faces engaged by said rollers whereby rotary movement of said gear wheel is communicated to said shaft, and a tool holder having driving connection with said shaft.

30 17. In a polishing machine, a base for the apparatus, a standard on which said base is mounted and having a universal joint connection therewith, whereby the mount is adapted to be rotated on a vertical axis and to be rocked on a horizontal axis, a stand having a plurality of legs and having a socket through which said standard passes and clamping means whereby said standard may be clamped within said socket to adjust it to varying elevations.

40 18. In apparatus of the character described a base, a support on which the base is pivoted whereby the base may be rocked in a vertical plane, a standard on which said support is mounted and having a swivel connection therewith whereby said support and base may have a swiveling movement in a horizontal plane, a motor mounted on said base, a carriage mounted on said base and adapted to have a sliding movement thereon, a rotary shaft carried by said carriage so as to move thereon and having a sliding move-

50 ment in a box which forms a part of said base, a gear wheel mounted upon said shaft having suitable driving connection with the motor, said gear wheel having a hollow hub projecting from one side thereof and a hollow slotted hub projecting from the other side thereof, said shaft passing through both of said hollow hubs, said shaft being non-circular in cross-section for a portion of its length intermediate its ends where it passes through said hubs and for some distance beyond said hubs, a pair of anti-friction rollers pivoted in said hollow hub spaced apart to allow the said non-circular portion of the shaft to pass between said rollers, the rear end of said shaft being journaled in a suitable support and the forward end of said shaft having a gear mounted thereon, a second shaft having a gear mounted thereon connected with said first mentioned gear, a case for said last mentioned gears supported by said carriage, said second shaft extending through the bottom of said case, and a tool having a universal joint connection with said second shaft.

75 19. In a polishing machine, a base on which the apparatus is mounted, a cross head in which said base is pivoted so as to rock in a vertical plane, a vertical standard on which said cross head is mounted to swivel in a horizontal plane, and a tripod having a socket head in which said vertical standard is adjustably clamped whereby the said standard may be vertically adjusted.

85 20. In a polishing machine, a base on which the apparatus is supported, a vertical rod on which said base is mounted, and a tripod having a socket head in which said vertical standard is adjustably clamped whereby the said standard may be vertically adjusted, and means for clamping said rod in its adjusted position.

In testimony whereof I affix my signature, in presence of two witnesses.

ERCOLE CAVICCHI.

Witnesses:

WILLIAM A. COPELAND,  
ALICE H. MORRISON.