

F. C. ROWELL & J. L. NOLAN.

ABRADING MACHINE.

APPLICATION FILED FEB. 23, 1909.

960,408.

Patented June 7, 1910.

4 SHEETS—SHEET 1.

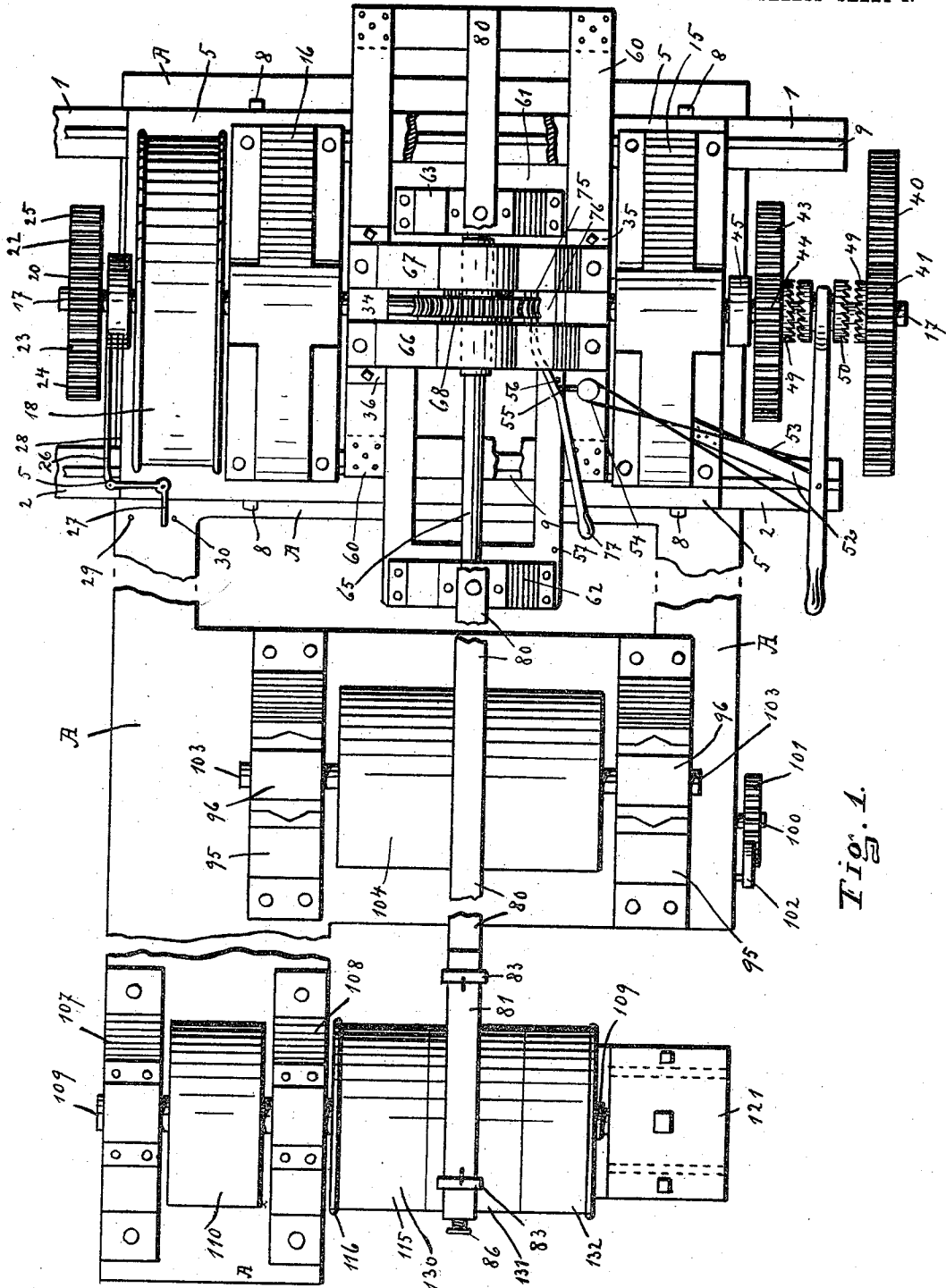


Fig. 1.

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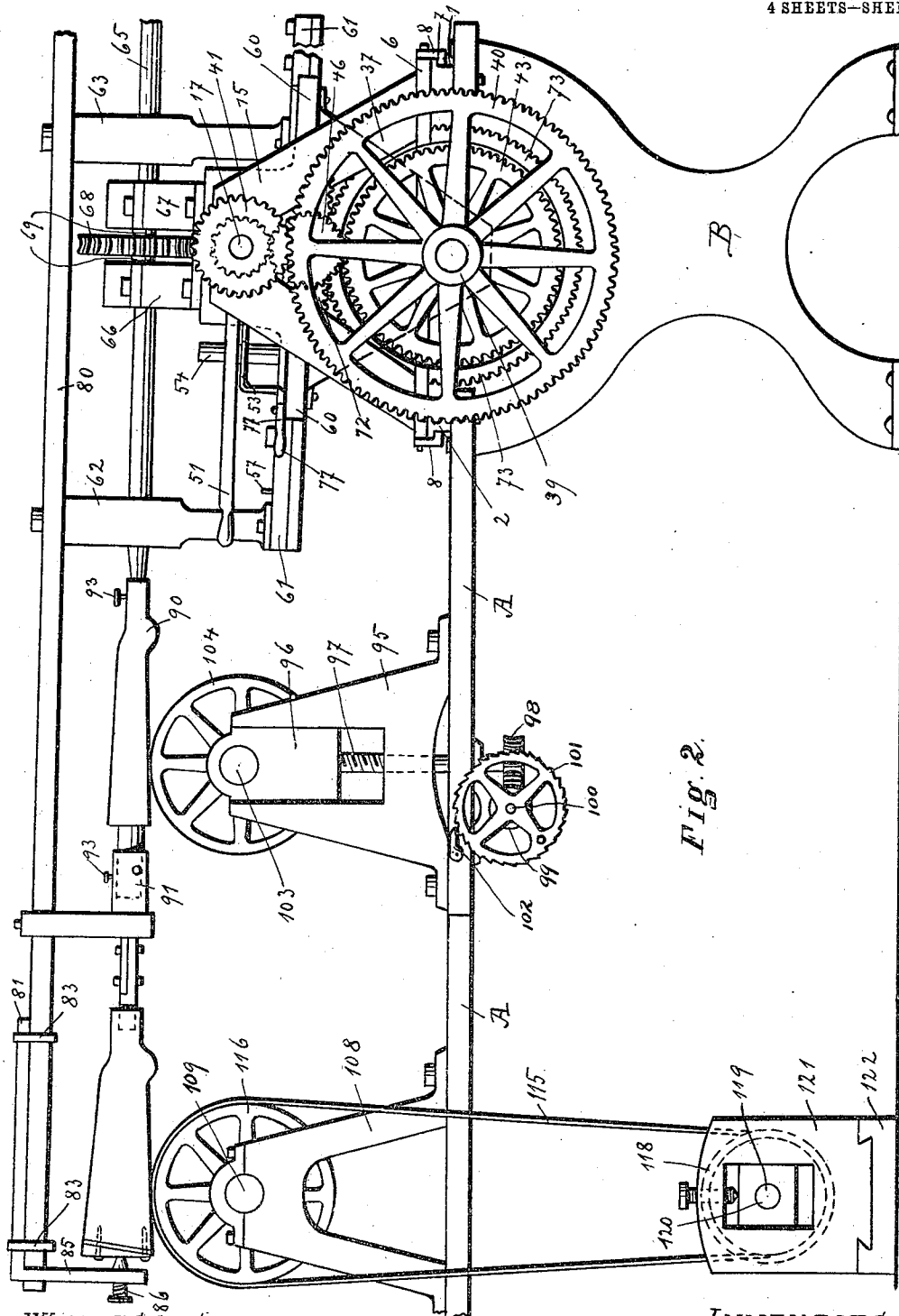
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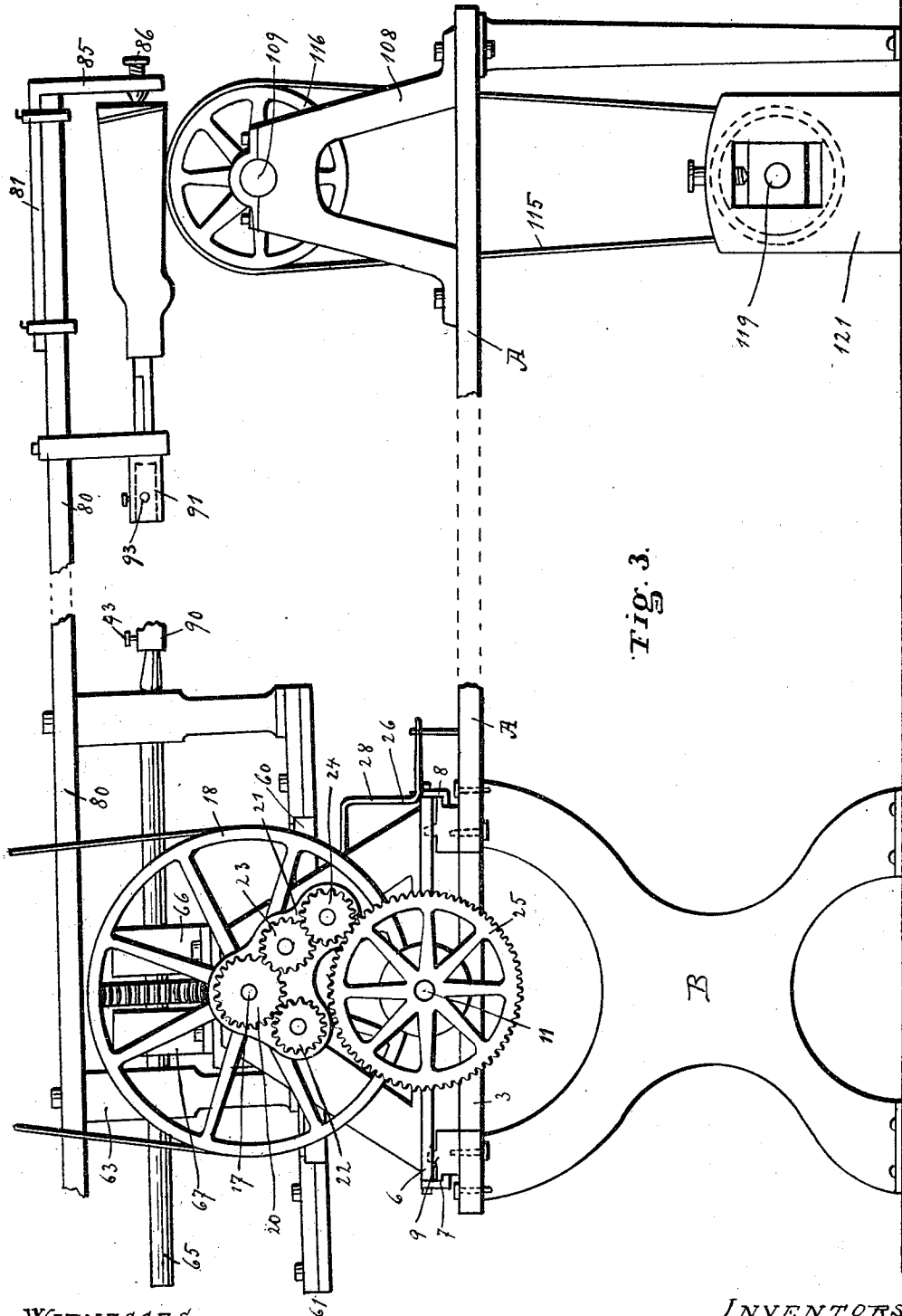
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4

960,408.

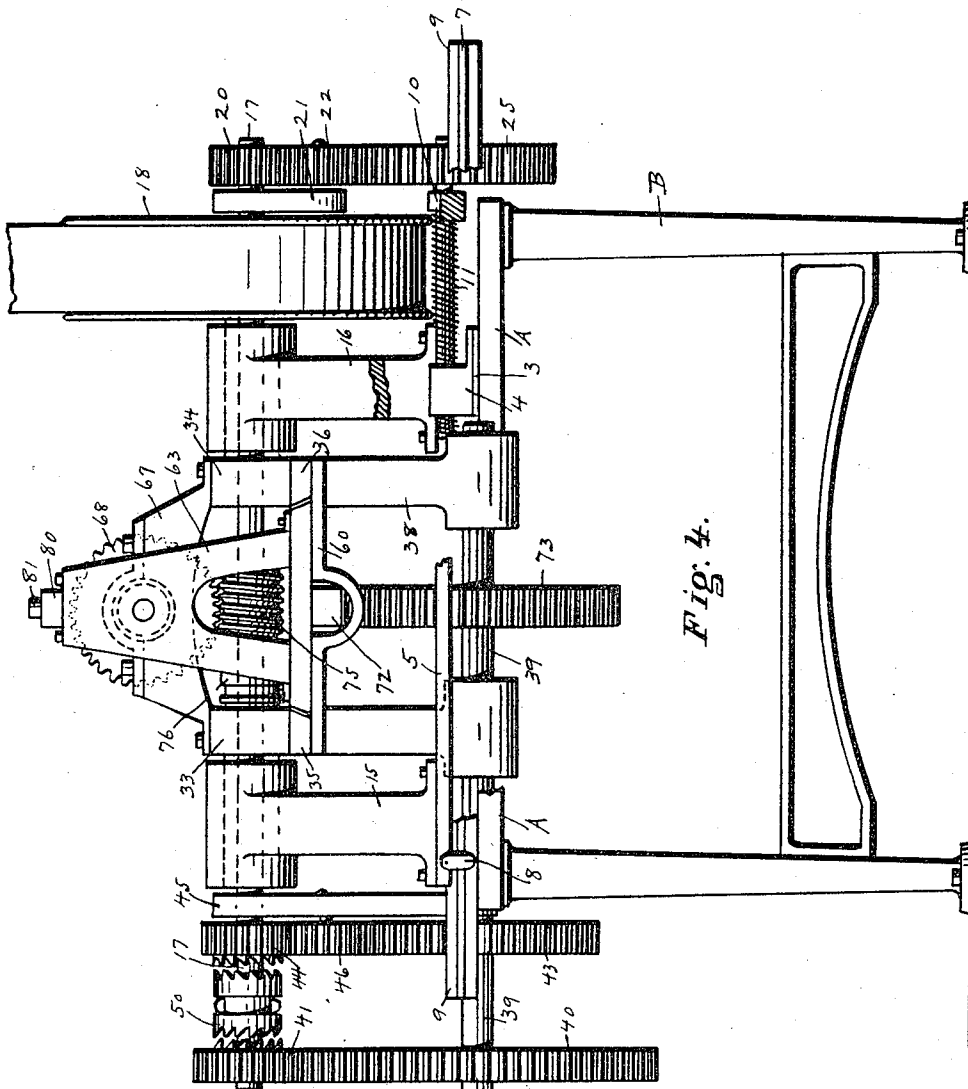


Fig. 4.

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UNITED STATES PATENT OFFICE.

FRANK C. ROWELL, OF ILION, AND JAMES L. NOLAN, OF MOHAWK, NEW YORK.

ABRADING-MACHINE.

960,408.

Specification of Letters Patent.

Patented June 7, 1910.

Application filed February 23, 1909. Serial No. 479,503.

To all whom it may concern:

Be it known that we, FRANK C. ROWELL and JAMES L. NOLAN, citizens of the United States, residing at Ilion and at Mohawk, respectively, in the county of Herkimer and State of New York, have invented certain new and useful Improvements in Abrading-Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

Our invention relates to an improved abrading machine, and we declare the following is a full, clear, concise and exact description thereof, sufficient to enable one skilled in the art to make and use the same, reference being had to the accompanying drawings in which like reference characters refer to like parts throughout.

While we refer to the invention as an abrading machine, we mean to include in that term the definition of a machine which may be used for forming articles of irregular shapes either of wood or any material and finishing and polishing them according to any given pattern.

The machine we have devised comprises means whereby the article to be worked may be moved sidewise across the entire width of the abrading surface, and at the same time it may be revolved so that all points will be subjected to the same abrading surface successively. It may be moved also longitudinally so that the work will be done from end to end of the article, and during these different operations the mechanism is capable of tilting so as to allow for any irregularities in the pattern.

The device is shown in the drawings as having a gun stock mounted for finishing, and it will be seen that the device carries a pattern stock which rests upon the wheel, the work itself being supported at one end of the pattern stock and resting upon the abrading surface, so that the irregularities of the pattern will be imparted to the work which is being finished, and the operation thereon will correspond to the pattern which it will be seen is necessarily somewhat smaller than the article itself.

In the drawings, Figure 1 is a plan view of the device; Fig. 2 is a side view; Fig. 3 is a side view from the opposite side, with certain middle portions cut out, and Fig. 4 is an end view at the head of the machine.

Referring to the figures in detail, the dif-

ferent parts of the device are supported on a table shown in general by A, one end of which is supported by legs B so formed as to provide a clearance crosswise of the table at one end, as seen in Fig. 3. From this end the table extends lengthwise of the machine for supporting the pattern carrying wheel, and being further extended to support a shaft which carries the abrading member, which is here shown in the form of a belt. Referring now to the other end of the table, parallel tracks are arranged crosswise the head of the table and shown by 1 and 2. A bar or frame indicated by 3 may be secured to the opposite portions of the table, one being shown by 3 on which is supported a fixed block 4 having a threaded aperture. On the tracks 1 and 2 is mounted a frame or carriage 5 comprising parallel side members which rest on the tracks and transverse members 6 for connecting the two and supporting parts of the mechanism. The track members are longitudinally cut out at the lower outer portion, leaving an overhang 7, and the track is provided with fingers 8 extending downward and beneath the overhang to keep the table from displacement, but to permit its moving from end to end of the tracks crosswise of the table. The track has rail 9, the carriage having corresponding grooves. At one end of the table and on the carriage is fixed a stud or block 10 apertured to register with the apertures of the fixed block 4 on the table.

A screw shaft 11 is mounted in the two blocks 4 and 10, being screwthreaded through block 4 and headed to block 10, by the revolution of which the carriage is moved to and fro on the table. This to and fro movement is effected by the following described parts. Supported on the carriage are two hangers or journal boxes, one near each end and shown by 15 and 16. At the upper part of these hangers is journaled and carried the shaft 17 which extends lengthwise of the carriage. Near one end of the shaft is fixedly mounted power pulley 18 through which power is transmitted from suitable source to operate different parts of the machine to be described. At the end of the shaft is mounted a gear 20 and adjacent thereto is a gear frame 21 loosely hung thereon which carries at one point a gear 22 and at another point a train of gears 23 and 24. At the end of the threaded shaft 11,

by which motion is imparted to the carriage, is mounted a gear 25 with which gears 22 and 24 mesh alternately by the positioning of the gear frame. It will thus be seen that the revolution of shaft 17 through the gears mentioned turns the threaded shaft 11 and reciprocates the carriage. This gear rack or frame is shifted by means of a lever 26 which consists of a bell crank 27 pivotally mounted on the carriage, having a handle at one end, the other end being connected to a rod 28. The other end is pinned or otherwise attached to the gear rack, so that the reciprocating of the lever handle pushes or draws the rod 28 and shifts the gear frame. Two pins 29 and 30 are mounted on the table at about the extremities of the movement of the carriage, with which the lever handle contacts at either end to operate the lever mechanism and swing the gear rack for reversing of the table.

The main shaft 17 extends the entire length of the carriage and beyond its ends to carry the mechanisms as stated. It passes through the journals in hangers 15 and 16, but it is supported in those journals by sleeve hangers 33 and 34. The journals are bored larger than the size of the shaft and the sleeve hangers fit in said bores and are themselves bored for the shaft. These sleeve hangers have depending portions 35 and 36 which in turn support other depending parts and support certain superposed parts. The depending parts consist of two hangers 37 and 38 which at the lower ends are bored to carry shaft 39 which extends outward on one side of the machine and at one end of the carriage about the distance of shaft 17, as will be seen from Fig. 4. It will thus be seen that the sleeve hangers 33 and 34 and the depending hangers 37 and 38 being all supported on the shaft 17, all the entire structure supported by or on the sleeve hangers may tilt to and fro so that the work to be finished may rise or fall according to the outlines of the pattern. At the end of shaft 39 is mounted gear 40 and at the end of the main shaft 17 is gear 41, the two meshing. The shaft 39 also carries a gear 43, and the power shaft also has a gear 44. A bar 45 is mounted on these two shafts and carries a gear 46 which is intermediate of gears 44 and 43, so that the revolution of power shaft 17 by one or the other connection with shaft 39 rotates the latter shaft in either direction, which is governed by the following described mechanisms.

Gears 41 and 44 have laterally projecting teeth 49 and a clutch 50 is splined on the shaft between the two gears provided with teeth also, so that the engagement of the clutch with one or the other gear actuates one or the other connections with the shaft 39. This clutch is actuated by a lever 51 pivotally mounted on arm 52 mounted on

the carriage and has attached thereto a belt 53, one end at each side of the pivotal bearing, which belt passes around a cylindrical member 54 mounted on the carriage and having a pin 55 projecting laterally therefrom over the carriage which moves the work longitudinally and which has two pins 56 and 57 so that the movement of the carriage to and fro by action of said pins alternately on pin 55 rotates the cylindrical member and shifts the lever to and fro.

Suitably connected to the lower part of the sleeve hangers 33 and 34 is frame 60 comprising side and end pieces which are adapted to support for longitudinal movement therein a feed carriage. This carriage consists of a base 61 which supports hangers 62 and 63, through which extends, being mounted in proper journals, the shaft 65. The sleeve hangers 33 and 34 also support the hangers 66 and 67 between which is mounted a worm gear 68, the mounting of said worm gear being on shaft 65 and being suitably positioned between the hangers 66 and 67 by sleeve or spacing rings 69, one on each side of the worm gear. The shaft 65 is splined through the worm gear 68 and the spacing rings so that it may play freely lengthwise therethrough, but receive power from the worm gear. The carriage which moves the work longitudinally to and fro and which carries the shaft 65 is moved to and fro by means of a rack 72 carried on the under part thereof with which gear 73 carried on shaft 39 meshes, so that the revolution of the shaft 39 in one direction or the other carries the carriage 61 and the shaft 65 which supports the pattern and the work. Motion is imparted to this shaft by worm gear 68 through worm 75 which is loosely mounted on the shaft 17 and has clutch teeth at one end.

At 76 is shown a clutch splined on the shaft 17 provided with teeth to engage the worm and throw it into action when required. This clutch is operated by means of a lever 77, at one end engaging a peripheral cutout in the clutch and at the other end terminating in a handle and being pivoted at a given point on the tilting table by action of which the gear is thrown in or out of action.

The hangers 62 and 63 support at the top an overhanging arm 80 which extends out over the pattern and over the work and has adjustable slidably connected member 81 secured with loops and thumb-screws 83 therein and having at the end of its offset portion 85 an adjusting screw 86 to engage and support one end of the material to be worked. The shaft 65 bears at one end against the pattern 90, the other end of the pattern being suitably supported in a carrier 91 to allow longitudinal adjustment, the other end of the carrier supporting the material to be

finished. All these connections are adjustable longitudinally. They are also adjustable transverse the axis by thumb-screws 93 properly positioned to effect exact positioning of the several parts. On the table are mounted brackets 95 which have adjustable journal boxes 96 supported on screws 97 mounted in the table and which have at one end a worm gear 98 which meshes with a worm 99 suitably mounted on a shaft 100 which is turned by means of wheel 101, a dog 102 being provided on the table to engage with ratchet teeth on the wheel 101 to hold the same in given position. It will be understood that the bracket and adjustable journal boxes are provided on each side with the same adjustment, the shaft 100 extending from one side of the table to the other. The journal boxes carry shaft 103 which supports a pattern wheel 104 on which the pattern rests during its work. At the end of the table is mounted a pair of brackets 107 and 108 which support a shaft 109 which carries power pulley 110. It will be understood that the pulleys 110 and 18 may receive their power from a common shafting above. The shaft 109 carries an abrading member 115 which in this instance is shown as a belt provided with a properly prepared surface but may be of any suitable character or form and which passes over the wheel or pulley 116 at the upper end and at the lower end passes over a wheel 118 which is carried on the shaft 119, each end of which is supported in an adjustable journal box 120 supported in proper foundation 121. This foundation block is mounted dovetail in base 122 so that when the parts are loosened the foundation may be slid out and a new abrading belt put in place. The shaft 119 is supported at each end in such a journal box so that the belt may be properly adjusted at each edge.

It is thus seen that the invention, illustrated in a single form, includes a laterally movable carriage, a tilting frame mounted thereon, a carriage movably mounted in the frame and carrying a work shaft relative to which the latter carriage is movable.

By the use of this machine, having a pattern and pattern-wheel together with a suitable cutting, grinding, abrading or polishing member, of whatsoever kind and for whatsoever work may be desired, an article may be worked down to any form, according to the pattern, and to any finish, being rotated on its center, moved lengthwise and shifted sidewise from one edge to the other of the abrading member which may be, of course, of any given width, one portion for instance, being coarse and another fine, or of two or more parts with different means for different kinds of work, as indicated by 130, 131 and 132, which represent different abrading surfaces.

Having described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. In a device of the character described, the combination with an abrading member 70 a pattern wheel, a pattern and a work-carrier of a plurality of carriages each movable relative to a fixed base whereby work may automatically be fed across the abrading member in each direction and lengthwise to and fro in a given line relative thereto, and be tilted on a fixed center to reproduce inequalities in the surface of the pattern, substantially as described. 75

2. A device of the character described having an abrading member, a pattern wheel, a pattern, means for supporting the pattern on the pattern wheel and the work against the abrading member, the said means comprising mechanisms whereby the work may be fed through its length and be reduced by the abrading member according to the configuration of that pattern, and means whereby the work may be continuously revolved while being so fed substantially as described. 80 85 90

3. A device of the character described having an abrading member, a pattern wheel, a pattern and an automatic reversible actuated carriage, means for supporting the pattern on the pattern wheel and the work against the abrading member, the said means comprising mechanisms whereby the work may be fed transversely across the abrading member and be reduced by the abrading member according to the configuration of that pattern, and means whereby the work and pattern may be continuously revolved in said passage, substantially as described. 95 100

4. A device of the character described having an abrading member, a pattern wheel, a pattern, means for supporting the pattern on the pattern wheel and the work against the abrading member, the said means comprising mechanisms whereby the work may be fed through its length to present each part of its surface to and be reduced by the abrading member according to the configuration of that pattern and means whereby the work may be moved across the abrading surface, substantially as described. 105 110 115

5. A machine of the character described consisting of an abrading member, a pattern wheel, a pattern and a fixed base, a carriage movably mounted thereon, means for reciprocating the carriage to and fro across the base, standards on the carriage, a rack pivotally hung on the standards, a feed-carriage slidably mounted on the rack, means for reciprocating the feed-carriage to and fro, a shaft supported on the feed-carriage, means for revolving the shaft independent of the to and fro movement of the shaft-supporting carriage, substantially as described. 120 125

6. A machine of the character described comprising an abrading member, a pattern 130

- wheel, a pattern and a transversely movable carriage, means for reciprocating the carriage to and fro, a rack or frame pivotally hung on the carriage, and means for reciprocating the same to and fro transverse the line of movement of the first-named carriage, the said reciprocating mechanisms being severally operated independent of the other, substantially as described.
- 10 7. A machine of the character described comprising an abrading member, a pattern wheel, a pattern and a frame mounted for transverse movement across the machine, means for reciprocating the frame to and fro, means on the frame supporting a shaft, means for revolving the shaft, the said several means for imparting motion being operative independent of the others, substantially as described.
- 15 8. A machine of the character described comprising an abrading member, a pattern wheel, a pattern and a carriage mounted to be reciprocated to and fro across the machine, a frame pivotally hung from the upper portion of the carriage, mechanisms mounted in connection with the said frame whereby to move the same to and fro lengthwise of the machine, the mounting of the same in the said frame providing for the reciprocation of the carriage lengthwise of the frame in any given line on the center of the said hanging of the frame, substantially as described.
- 20 9. A machine of the character described having an abrading member, a pattern wheel, a pattern and a frame hung thereon at the upper part thereof, a carriage slidably mounted thereon to move lengthwise of the machine and a shaft mounted in the said carriage, means connected therewith for revolving the same while the shaft is moved lengthwise of the machine in any given line by movement of the said shaft-supporting carriage lengthwise of the frame in a given angle relative to the bed of the machine, substantially as described.
- 25 10. In a machine of the character described, a revolving shaft, means for revolving the same, means for moving the shaft lengthwise of the machine, a pattern carried at one end of the shaft, a pattern-controller mounted to support the pattern, an abrading member at one end of the machine, the work to be abraded being supported at the end of the pattern with its axis coincident with the axis of the shaft and the pattern, substantially as described.
- 30 11. In a machine of the character described having a pattern wheel, a pattern and an abrading member, the said member comprising oppositely disposed revolving wheels or cylinders, means carried on the same, and an abrading surface carried over the same and means for adjusting one of the same whereby to fix the tension of the said last-mentioned means, substantially as described.
- 35 12. In a machine of the character described the combination with a frame of a transversally reciprocating carriage mounted thereon, a tilting rack or frame mounted on the carriage and a longitudinally reciprocating carriage mounted on the frame substantially as described.
- 40 13. In a machine of the character described, a base, an abrading member, a pattern wheel, a pattern and a carriage mounted to be moved to and fro across the machine, means for moving the carriage to and fro, a carriage mounted on the former carriage and adapted to be moved lengthwise of the machine, means for moving the latter carriage lengthwise, and means automatically operative to reverse the movement of the carriages, means for supporting the pattern on the pattern wheel and the work against the abrading member and means whereby the work may be continuously revolved while being supported against the abrading member, substantially as described.
- 45 14. In a machine of the character described, a revoluble shaft, means for revolving the shaft, means for feeding the shaft lengthwise of the machine, means at one end of the shaft for supporting a pattern, means for adjusting the position of the pattern, and means at the end of the pattern for supporting material to be abraded, the axes of the shaft, pattern and the said material being coincident, substantially as described.
- 50 15. A machine of the character described having an abrading member, a pattern wheel, a pattern and a carriage movable lengthwise of the machine, means for reciprocating the carriage, means for automatically reversing the movement of the carriage, means supported on the carriage and projecting lengthwise of the machine whereby to support the work to be abraded, and means for adjusting the position of said work means for continuously rotating said work while being abraded, substantially as described.
- 55 16. In a machine of the character described the combination with a frame of a transversally reciprocating carriage mounted thereon, a tilting rack or frame mounted on the carriage and a longitudinally reciprocating carriage mounted on the tilting frame a revoluble work-carrying shaft mounted on the tilting frame and means for reciprocating the carriages, substantially as described.
- 60 17. In a machine of the character described the combination with a frame and an abrading means mounted therewith, of a carriage adapted to a reciprocating movement, a frame or rack pivotally mounted thereon, a carriage mounted on the frame or rack and adapted to a reciprocating movement and a

shaft revolubly mounted on the latter rack or frame, the same being adapted to support a pattern and the material to be worked substantially as described.

5 18. A device of the character described having an abrading member, movable work-supporting and carrying members and a pattern member whereby to adjust the position of the work relative to the abrading member, the said means being adapted to reduce the work at all points of its surface according to the configuration of the pattern, the work being capable of movement by the said means lengthwise and crosswise of the machine and at different angles to the bed of the machine and being revolved at the same time, substantially as described.

15 19. In a machine of the character described, the combination of a frame, carriages one supported on the other and severally movable, one across and the other lengthwise the frame, a revolving work-carrying shaft carried by the carriages, one of said carriages being tiltingly mounted relative to the frame, substantially as described.

20 20. In a machine of the character de-

scribed, the combination of a frame, carriages one supported on the other and severally movable, one across and the other lengthwise the frame, a revolving work-carrying shaft carried by the carriages, substantially as described.

21. In a machine of the character described, the combination of a frame, a tiltingly-mounted longitudinally-movable carriage, a work-supporting shaft revolubly mounted in the carriage, substantially as described.

22. In a machine of the character described, the combination of a frame, a tiltingly-mounted longitudinally-movable carriage, a work-supporting shaft revolubly mounted in the carriage, and means automatically reversing the movement of the carriage, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

FRANK C. ROWELL.
JAMES L. NOLAN.

Witnesses:

HENRY M. LOVE,
ELEANOR T. DE GIORGI.