No. 831,272. PATENTED SEPT. 18, 1906.

N. W. FLETCHER.

PNEUMATIC TOOL.

APPLICATION FILED MAY 16, 1904.

2 SHEETS—SHEET 1.

Fig. 1

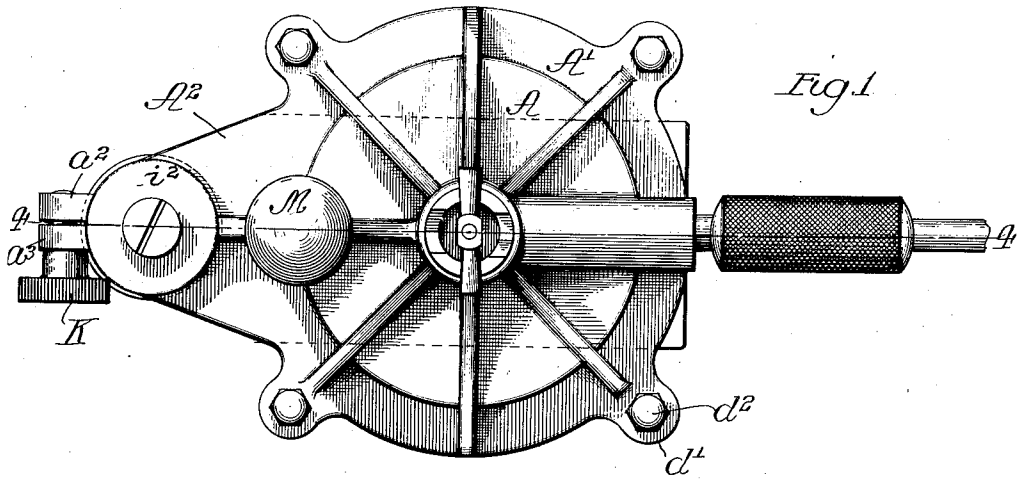


Fig. 2

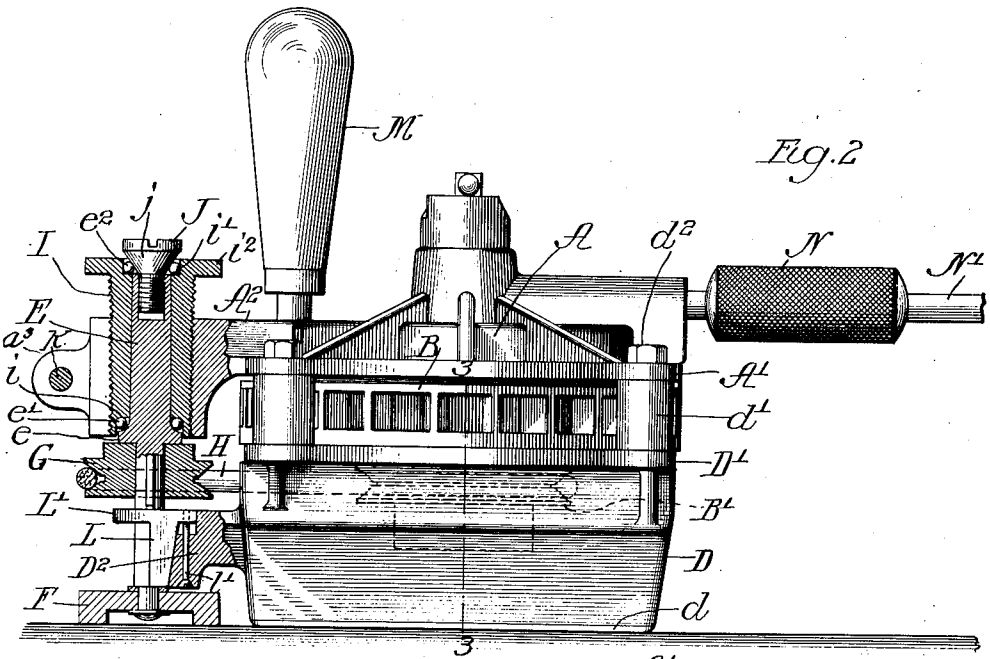
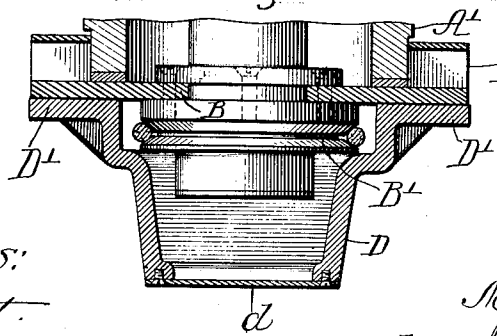


Fig. 3



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2 SHEETS—SHEET 2.

Fig. 4

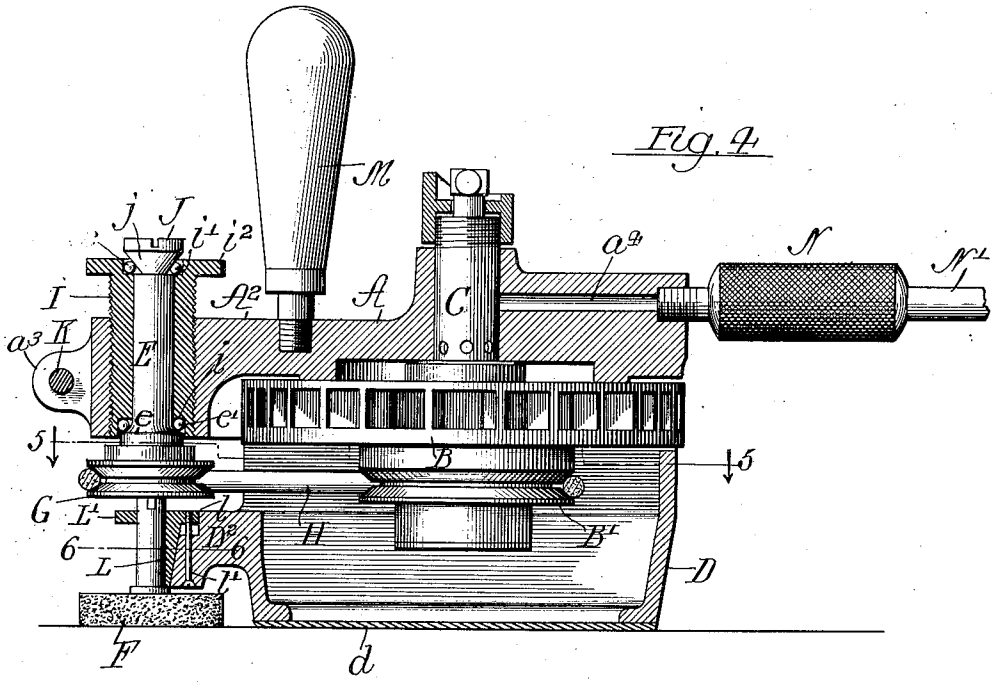


Fig. 5

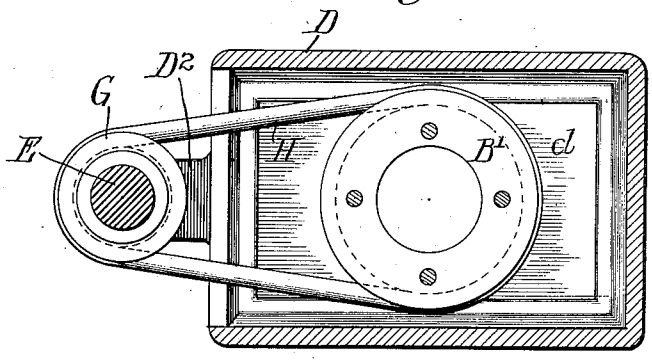
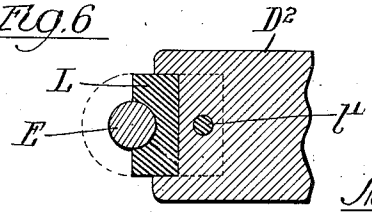


Fig. 6



Witnesses:
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UNITED STATES PATENT OFFICE.

NATHAN W. FLETCHER, OF CHICAGO HEIGHTS, ILLINOIS, ASSIGNOR TO TURBINE MOTOR TOOL COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PNEUMATIC TOOL.

No. 831,272. Specification of Letters Patent. Patented Sept. 18, 1906.

Application filed May 16, 1904. Serial No. 208,244.

To all whom it may concern:

Be it known that I, NATHAN W. FLETCHER, a citizen of the United States, residing at Chicago Heights, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pneumatic Tools; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to portable machines for cutting, polishing, or grinding of that class which has a rotative or turbine motor and a supporting block or base adapted to rest or slide upon the surface of the work or object to be operated upon and which supports a rotative grinding, polishing, or cutting tool, and the motor which drives the same.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a plan view of a grinding or polishing machine constructed in accordance with my invention. Fig. 2 is a side view thereof with parts in section. Fig. 3 is a detail cross-section of the base-plate or supporting-block of the machine with parts adjacent thereto, taken on line 3 3 of Fig. 2. Fig. 4 is a longitudinal vertical section taken on line 4 4 of Fig. 1. Fig. 5 is a plan section taken upon line 5 5 of Fig. 4. Fig. 6 is a detail section, on an enlarged scale, taken on line 6 6 of Fig. 4.

As illustrated in said drawings, A indicates a horizontally-arranged top plate which constitutes the non-rotative member of a turbine-motor, and B indicates the rotative member or wheel of such a motor, which is provided with an annularly-arranged series of blades or buckets and is mounted on a bearing or supporting spindle C, secured centrally in the plate A. D indicates a base on which the motor is mounted and which is provided with a flat horizontal surface *d*, which rests and slides upon the surface of the work. Said base, to avoid undue weight, preferably has the form of a hollow shell or casing provided at its top with horizontally-extending flanges D′ D′. The top plate A is located above and parallel with the bottom surface of the base D at a distance therefrom sufficient for the interposition of the motor-wheel B, and the plate is provided with a horizontal flange A′, having radially-extending lugs, between which and the flange D′ are located thimbles or posts *d′ d′*, by which the base D and the top plate A are held at a suitable distance from each other and in parallel relation. The parts are herein shown as rigidly connected by means of bolts d^2, inserted through the flanges A′ and D′ and the thimbles *d′ d′*.

The top plate A and the base D, joined as described, constitute a frame on which the operative parts of the implement are mounted. On one side of the top plate A is a rigid horizontally-extending arm A^2, and on the base D below said arm is a like horizontally-extending arm D^2. Said arms A^2 D^2 constitute bearings for a vertically-arranged tool-carrying shaft E. Said shaft will be provided at its lower end with any suitable form of grinding, polishing, and cutting tool adapted to act upon the surface on which the base-plate D rests and slides. The tool E, illustrated in the accompanying drawings, consists of a grinding-disk F, which is secured centrally to the lower end of the shaft E and has an annular downwardly-facing flat grinding-surface at its marginal part, Fig. 2. Provision is made for driving said tool-shaft E from the motor, consisting of a belt-pulley B′, affixed to the lower face of the rotative part or wheel B of the motor, a belt-pulley G, affixed to the tool-shaft E between the arms A^2 D^2, and a driving-belt H, trained over the driving-pulleys E′ G.

Provision is made for mounting the tool-shaft E in the supporting-arms A^2 and D^2 in such manner that the shaft may be adjusted vertically for the purpose of bringing the rotative tool F into proper vertical position with respect to the surface of the work upon which the supporting-plate D rests, these parts being made as follows: Said arm A^2 is provided with a vertical bore or passage considerably larger in diameter than the said tool-shaft E. In the bore of the arm A^2 is inserted a tube or sleeve I, which has screw-threaded engagement with the arm and a cylindric interior bearing-surface within which fits the upper cylindric portion of the shaft E. Said shaft is provided at the lower

end of said sleeve I with a flange or collar *e*, forming an upwardly-facing shoulder, which forms the end bearing of the shaft against the said sleeve. As preferably constructed the lower end of the said sleeve I is provided with an annular groove or recess *i*, forming a downwardly-facing bearing-shoulder, between which and the flange *e* are located antifriction-balls *e'*. At the upper end of said shaft E the same is provided with an axial screw-threaded recess to receive the shank of a screw J, which has a head having a conical bearing-surface *j*, and the upper end of the sleeve I is provided with a groove *i'* to receive a series of antifriction-balls e^2, which are interposed between said groove and the head of the screw J. The part of the arm A^2 which surrounds and embraces the sleeve I is, moreover, split vertically and provided at the opposite margins of its separated parts with outwardly-extending lugs a^2 a^3, which are engaged by a clamp-screw K, having a milled head, whereby the screw-threaded sleeve I may be clamped and held from turning in the arm when adjusted to a desired position, and thereby held rigidly or immovably in position. Said sleeve is provided at its upper end with an outwardly-extending flange i^2, which is milled at its outer edge and by which the said sleeve may be turned, and thereby given upward or downward movement when the clamp-screw K is released.

It will be obvious from the construction above described that the screw-threaded sleeve I provides means for adjusting vertically the tool-carrying shaft E, so as to bring the tool itself accurately in a desired position with respect to the surface being operated upon to control the depth of cut or for use in case of the wearing away of the abrading or cutting surface of the tool—as, for instance, when the same is composed of a grinding-disk of emery, corundum, and the like.

The bearing by which the lower end of the tool-shaft E is supported in the arm D^2 of the machine-frame involves novel features of construction, as follows:

L indicates a bearing-block of wedge form, having an inclined bearing-surface in contact with the corresponding inclined bearing-surface on the end of the arm D^2 and provided in its outer face with a concave bearing-surface engaging the side of the shaft nearest the machine-frame. At its upper end said block L is provided with a ring-shaped part L', which surrounds the shaft E. Said top part L' extends toward the body of the machine in the form of a horizontal lug *l*, which enters a guide-recess in the upper part of the arm D^2, and said lug is engaged by a vertical screw *l'*, which passes upwardly through the said arm D^2 and has screw-threaded engagement at its upper end with said lug *l*. Said screw *l'* has at its lower end a head which bears upwardly against the bottom of said arm D^2. By the turning of said screw *l'* the block L may be moved downwardly, the inclination of the contact-surfaces of said block and the arm engaged thereby being such that as the block is moved downwardly it will be shifted outward or toward the central axis of the tool-carrying shaft, thereby affording lateral adjustment of the said bearing-block with respect to the shaft for the purpose of taking up any looseness caused by wear and insuring that the shaft shall remain in a vertical position and in alinement with the central axis of the sleeve I, notwithstanding the wearing away of the bearing-surface of the bearing-block L or of the part of the shaft itself in contact therewith. It will of course be understood that inasmuch as the driving-belt H exerts pressure on the shaft, tending to pull or draw the same toward the frame of the machine, said shaft will always be pressed against the bearing-block L and will be held in close running contact therewith, notwithstanding such wear in the parts as may result in a loose fit between the upper part L' of the said bearing-block, which surrounds the shaft, and the said shaft.

It is to be understood that any suitable form of rotative motor or turbine may be employed in the machine embracing the features of construction above described. The particular motor herein illustrated is like that described and shown in my prior application for United States Letters Patent, filed April 27, 1904, Serial No. 205,098.

The tool illustrated is provided with two handles M and N, which may be grasped in handling the same. The handle N is shown as made hollow and attached to the outer end of an elevated radial ridge on the top plate A, in which is formed a supply-passage a^4 for the air or pressure fluid, said handle N being adapted for connection at its outer end with an air-supply tube N'. The handle M is shown as attached to the upper surface of the frame-plate A near the inner end of the arm A^2 and as rising vertically therefrom.

It is to be understood that the driving connection between the motor-wheel or rotative part of the motor and the tool-shaft may be made otherwise than in the form of a driving-belt and belt-pulleys, and also that the frame of the implement provided with a base adapted to slide on the work as described may be constructed otherwise than as shown in the accompanying drawings.

Details of construction in the parts of the implement may be modified in many respects in practice without departure from my invention as set forth in the appended claims.

I claim as my invention—

1. A tool for the purposes set forth comprising a main frame embracing a base having a flat, bottom bearing-surface, a turbine-motor, the rotative member of which is mounted centrally over the base with its axis

of rotation vertical and the non-rotative member of which is rigidly attached to said base and constitutes a part of the frame, an upright tool-shaft located outside of said base, a rigid arm on the frame affording a bearing for said shaft, end bearings for the shaft which are adjustable on said arm in a direction endwise of the shaft, and gearing connecting the rotative member of the motor with said tool-shaft.

2. A tool for the purpose set forth comprising a frame provided with a base having a flat, bottom bearing-surface, a turbine-motor mounted on said frame, an upright tool-shaft located exterior to the base and provided with a tool at its lower end, a rigid arm on the frame which affords a bearing for said shaft, driving means connecting the said rotative member of the motor with said shaft, and means for adjusting the shaft vertically on said supporting-arm and securing it in its adjusted position, embracing a bearing-sleeve which surrounds the shaft and is provided with end bearings for the same, said sleeve having screw-threaded engagement with said arm.

3. A tool for the purposes set forth comprising a frame provided with a base having a flat bottom bearing-surface, a turbine-motor mounted on said frame, an upright tool-shaft located exterior to the base and provided with a tool at its lower end, a rigid arm on the frame which affords a bearing for said shaft, driving means connecting the said rotative member of the motor with said shaft, and means for adjusting the shaft vertically in said supporting-arm and holding it in its adjusted position, embracing a sleeve affording a bearing for the shaft and having screw-threaded engagement with said arm and clamping means on the arm for holding the said sleeve from rotation therein.

4. A tool for the purposes set forth comprising a frame provided with a base having a flat, bottom bearing-surface, a turbine-motor mounted on said frame, an upright tool-shaft located exterior to the base and provided with a tool at its lower end, a rigid arm on the frame which affords a bearing for said shaft, driving means connecting the said rotative member of the motor with said shaft, a sleeve affording a bearing for the shaft and having screw-threaded engagement with said arm, clamping means on the arm for holding the said sleeve from rotation therein, said sleeve and the said shaft having upwardly and downwardly facing annular bearing-surfaces and antifriction-balls interposed between the said bearing-surfaces.

5. A tool for the purposes set forth comprising a frame provided with a base having a flat, bottom bearing-surface, a turbine-motor mounted on said frame, an upright tool-shaft located exterior to the base and provided with a tool at its lower end, a rigid arm on the frame which affords a bearing for said shaft, driving means connecting the said rotative member of the motor with said shaft, a sleeve affording a bearing for the shaft and having screw-threaded engagement with said arm, clamping means on the arm for holding the said sleeve from rotation therein, said sleeve and the said shaft having upwardly and downwardly facing annular bearing-surfaces and antifriction-balls interposed between the said bearing-surfaces, and a screw inserted in the upper end of the shaft, on which is formed the downwardly-facing annular bearing-surface at the upper end of the shaft.

6. A tool for the purpose set forth, comprising a frame provided with a base having a flat, bottom bearing-surface, a turbine-motor mounted on said frame, an upright tool-shaft located exterior to the base, and provided with a tool at its lower end, a rigid arm on the frame which affords a bearing for said shaft, driving means connecting the said rotative member of the motor with said shaft, and means for adjusting the shaft vertically on said supporting-arm and holding it in its adjusted position, embracing a sleeve affording a bearing for the shaft and having screw-threaded engagement with said arm, said shaft having a lower upwardly-facing bearing-shoulder, and being provided at its upper end with a screw, the head of which forms a downwardly-facing bearing-shoulder for the shaft.

7. A tool for the purposes set forth comprising a frame provided with a base having a flat, bottom bearing-surface, a turbine-motor mounted on said frame, an upright tool-shaft located exterior to the base and provided with a tool at its lower end, a rigid arm on the frame which affords a bearing for said shaft, driving means connecting the said rotative member of the motor with said shaft, a sleeve affording a bearing for the shaft and having screw-threaded engagement with said arm, said arm being split and provided with a clamping-screw by which said sleeve may be clamped from turning in the arm.

8. A tool for the purpose set forth, comprising a frame provided with a base having a flat, bottom bearing-surface, a turbine-motor, the rotative member of which is mounted centrally over the base with its axis of rotation vertical and the non-rotative member of which forms part of the frame, an upright tool-carrying shaft mounted outside of the base, vertically-separated rigid arms extending from the frame and affording bearing for the upper and lower ends of the tool-shaft and driving connections between the rotative part of said motor and the shaft, engaging the shaft at a point between the said upper and lower bearing-arms.

9. A tool for the purposes set forth comprising a frame provided with a base having

a flat bottom surface, a turbine-motor mounted on the frame, an upright tool-carrying shaft mounted outside of the base, vertically-separated rigid arms extending from the frame and affording bearing for the upper and lower ends of the tool-shaft, driving connections between the rotative part of said motor and the shaft, engaging the shaft between the upper and lower bearing-arms, said lower arm being provided with a vertically-movable wedge-block adapted to bear on the inner side of said shaft, and means for vertically adjusting said block and holding it in its adjusted position.

10. A tool for the purpose set forth comprising a frame embracing a base having a flat bottom surface, a horizontal top plate rigidly secured to said base above and parallel with the same, a turbine-motor, the stationary member of which is formed by the top plate of the frame and the rotative member of which is arranged horizontally between said base and said top plate or member of the frame, an upright tool-carrying shaft located outside of the base, a rigid arm on the frame affording a bearing for said shaft, and driving connections between the said rotative member of the motor and the said shaft.

11. A tool for the purposes set forth comprising a frame which embraces a base having a flat, bottom bearing-surface and a top plate which is rigidly connected with said base, a turbine-motor, the stationary part of which is formed by the said top plate of the frame and the rotative part of which is arranged horizontally between said top plate of the frame and said base, an upright tool-carrying shaft located outside of the base, supporting-arms for said shaft, rigidly secured one to said top plate of the frame and the other to the said base, and driving connections between the rotative member of the motor and the shaft connected with the shaft at a point between the said bearing-arms.

12. A tool for the purposes set forth comprising a frame which embraces a base portion having a flat, bottom bearing-surface and a top plate which is rigidly connected with said base member, a turbine-motor, the stationary part of which is formed by the said top plate of the frame and the rotative part of which is interposed between said top plate of the frame and said base, an upright tool-carrying shaft located outside of the base, supporting-arms for said shaft rigidly secured one to said top member of the frame and the other to the said base, driving connections between the rotative member of the motor and the shaft, connected with the shaft at a point between the said bearing-arms, and means for vertically adjusting said shaft embracing a rotative sleeve having screw-threaded engagement with the upper arm and forming a bearing for the upper end of said shaft.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 11th day of May, A. D. 1904.

NATHAN W. FLETCHER.

Witnesses:

GERTRUDE BRYCE,

W. W. HALL.