No. 691,740. Patented Jan. 28, 1902.

J. W. BIRKENSTOCK.

PNEUMATIC POLISHING TOOL.

(Application filed Feb. 25, 1901.)

(No Model.)

Fig:1.

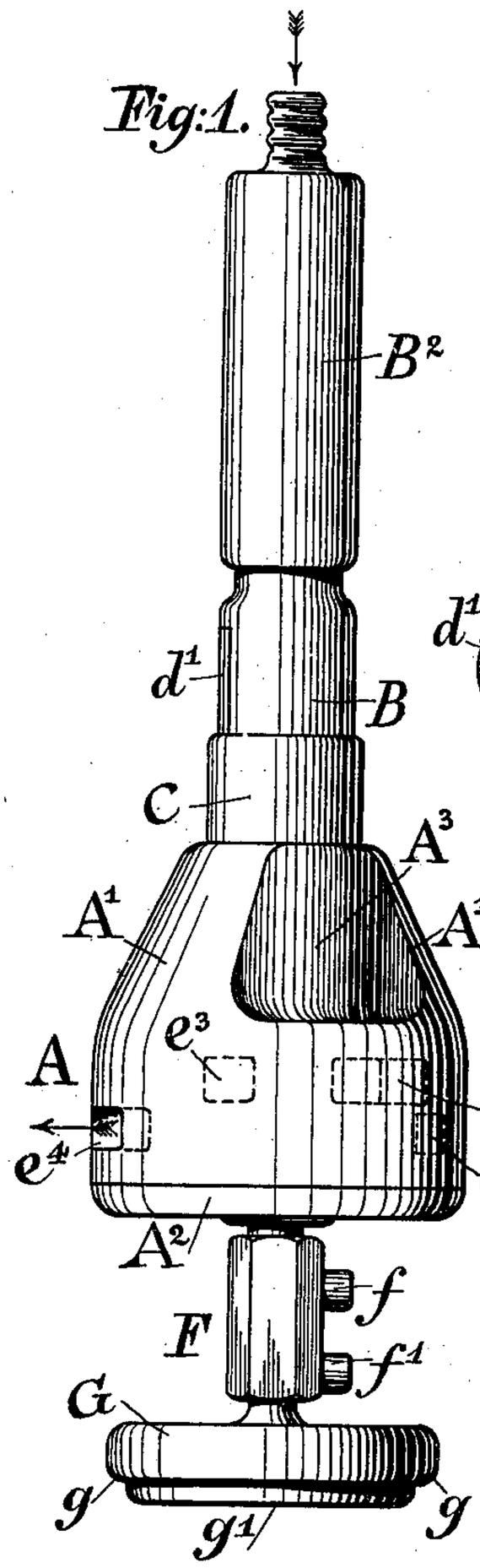


Fig:2.

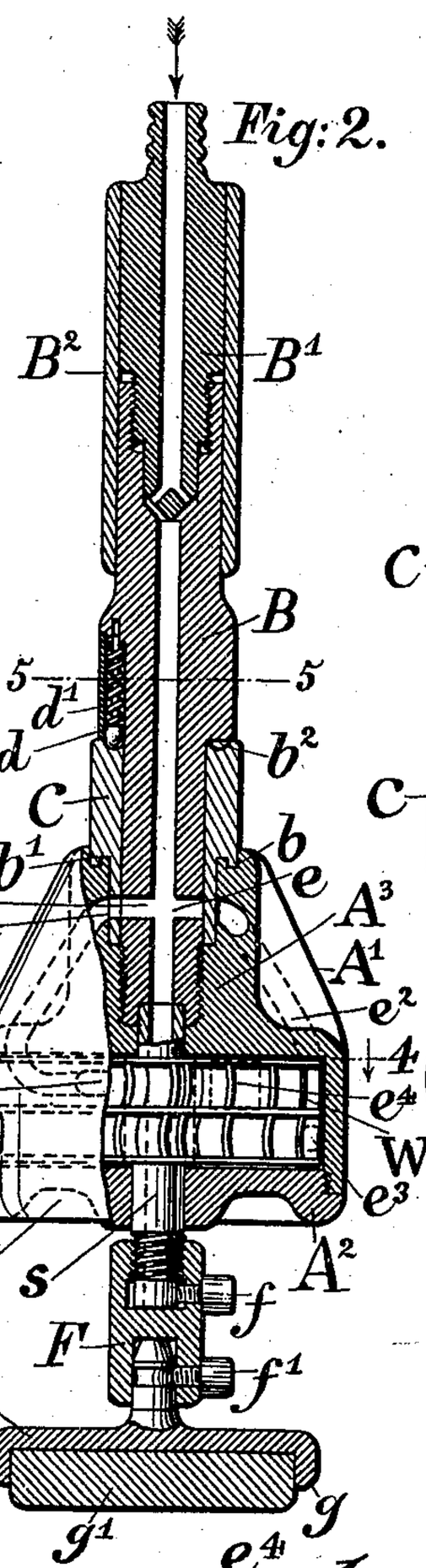


Fig:5.

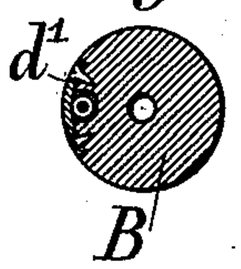


Fig:7.

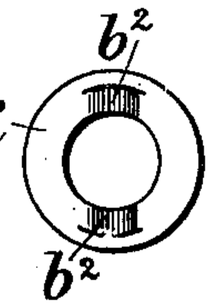


Fig:6.

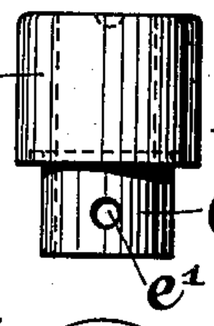


Fig:8.

Fig:3.

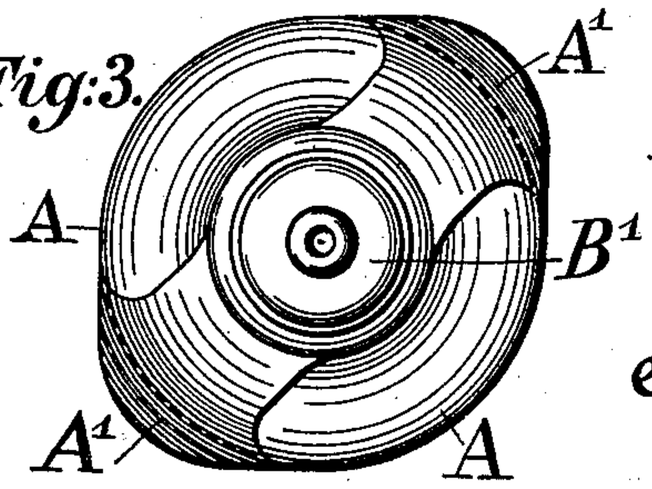
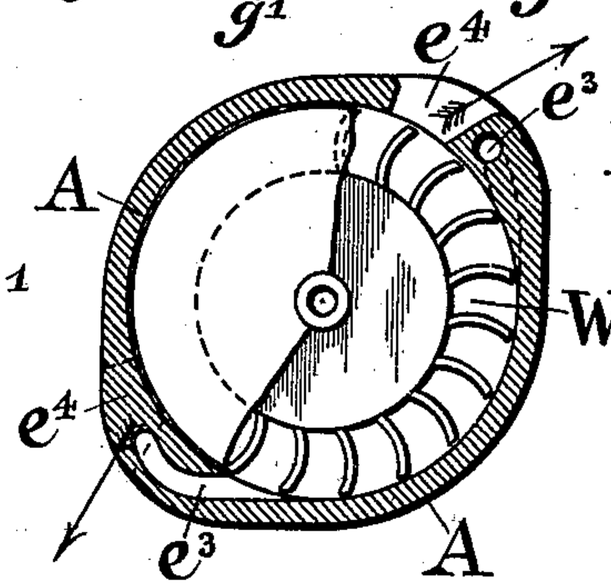


Fig:4.



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PNEUMATIC POLISHING-TOOL.

SPECIFICATION forming part of Letters Patent No. 691,740, dated January 28, 1902.

Application filed February 25, 1901. Serial No. 48,777. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. BIRKENSTOCK, a citizen of the United States, residing in New York, borough of Manhattan, in the State of New York, have invented certain new and useful Improvements in Pneumatic Grinding and Polishing Tools, of which the following is a specification.

This invention relates to an improved grinding and polishing tool which is operated by compressed air and which is intended to be used for grinding and polishing marble and other stones in an effective and uniform manner; and the invention consists of a pneumatic grinding and polishing tool which comprises a cylindrical casing, a tubular spindle, a paddle-wheel within said casing, a shaft for said paddle-wheel, supply-channels connecting the tubular spindle for supplying compressed air to said paddle-wheel, outlet-channels for permitting the escape of the expanded air, and a socket for the shank of the grinding-tool attached to the outer end of the paddle-wheel shaft; and the invention consists, further, of certain details of construction and combinations of parts, which will be fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a side elevation of my improved pneumatic grinding and polishing tool. Fig. 2 is a vertical central section of the same. Fig. 3 is a plan view of Fig. 1. Fig. 4 is a horizontal section on line 4 4, Fig. 2. Fig. 5 is a horizontal section on line 5 5, Fig. 2; and Figs. 6, 7, and 8 are respectively a side elevation, a top view, and a bottom view of the socket connection between the tubular spindle and the casing of the paddle-wheel.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the casing of my improved pneumatic grinding and polishing tool. The casing A is made cylindrical at its lower part and provided with a conically-tapering upper part that is recessed at opposite sides, so as to form a yoke or bridge-shaped portion A′. The casing A is closed at the lower part by a head A^2, which is provided with a circumferential screw-threaded shoulder and rim, by which it is screwed to the lower end of the casing A. The upper portion A′ of the casing A is provided with a central socket A^3, into which is screwed the lower threaded end of a tubular spindle B, which is coupled at its upper end by a tubular coupling B′ and an exterior sleeve B^2 with a suitable source of compressed air by means of a flexible hose or otherwise. The tubular coupling B′ is provided with lateral channels that are connected with the tubular bore of the spindle B, so that the air under pressure is not admitted directly into said bore, but supplied through the lateral channels of the coupling B′. Between a shoulder *b* of the spindle B and the upper end of the socket A^3 of the casing A is interposed a sleeve C, the lower portion C′ of which in the socket A^3 is of smaller diameter than the upper or main portion of the sleeve, so as to form an annular shoulder *b*′, which is fitted into a corresponding annular groove in the upper end of the socket A^3 of the casing A, as shown clearly in Fig. 2. The upper end of the sleeve C is provided at diametrically opposite points with notches b^2, of which one is engaged at a time by a spring-actuated bolt *d*, which is secured in a recess of the spindle B, said recess being closed by a plate *d*′, as shown in Figs. 2 and 5. The spindle B is provided in its lower end within the socket A^3 with lateral channels *e*, that extend at right angles with the bore of the spindle B, said channels being within the lower portion C′ of the sleeve C, so as to be covered by the same. The lower portion C′ of the sleeve C is provided at one point in its circumference with a port *e*′, which may be made to register with either one of the lateral channels *e* of the spindle when the sleeve is turned around the spindle. When the aperture *e*′ in the lower part C′ of the sleeve registers with one or the other of the channels, it is locked in this position by the spring-actuated bolt *d*, engaging one or the other of the notches b^2 in the top part of the sleeve C, as shown in Fig. 2. The lateral channels *e* of the spindle B are connected by downwardly-extending channels e^2, that are arranged in the yoke or bridge portion A′ of the casing, with the interior space of the

casing, and the lower ends of which are directed inwardly and terminated by ports e^3. A paddle-wheel W is arranged at the interior of the casing A, the shaft of which is supported in bearings of the socket A^3 and of the head A^2. The paddle-wheel W may be arranged as a single or double row of paddles, the reversing of the motion of the paddle-wheel being accomplished according as the compressed air is supplied from the tubular spindle through port e^3 of one or the other of the channels e^2 to opposite sides of the casing. When two rows of paddles are arranged, the left-hand channel communicates with the upper row of paddles and the right-hand channel with the lower row of paddles, as shown clearly in Fig. 2. Adjacent to the supply-channels e^2 are arranged discharge-ports e^4 in the casing, as shown in Figs. 1 and 4, so as to permit the expanding of the air from the casing of the paddle-wheel to the outside. To the lower end of the shaft of the paddle-wheel W is attached an intermediate double socket F, the upper socket of which has an interior screw-thread into which the lower end of the paddle-wheel shaft is screwed and retained by the clamping-nut f, while into the lower socket is inserted the grooved shank of the grinding-tool G, said shank being firmly retained by means of a clamping-screw f', as shown in Figs. 1 and 2. The double socket F is preferably made in hexagonal or other shape, so as to be readily applied to or removed from the shaft of the paddle-wheel by means of a wrench and permit thereby an exchange of tools. The grinding-tool G is composed of a socket g and a steel grinding-plate g', said plate being retained in the socket in any suitable manner.

The two lateral channels e in the tubular spindle and the two supply-channels e^2 in the casing A A′ serve for the purpose of permitting the reversal of the motion of the grinding-tool when desired. Air under pressure is supplied through the bore of the tubular spindle and the connecting supply-channels to the paddle-wheel, so as to rotate the same in one or the opposite direction, according as the sleeve C′ and its supply-port e' is placed in connection with one or the other supply-channel e and downwardly-extending channel e^3. After the force of the compressed air is exerted on the paddle-wheel the expanded air is permitted to escape through the discharge-port e^4, located at the opposite side of the casing. By intermittently reversing the motion of the grinding-tool the even wearing off of the grinding-plate and the uniform grinding or polishing action of the tool on the marble or other stone to be ground or polished is produced. For grinding a coarser-grained tool is used, while for polishing a finer-grained tool is required.

My improved pneumatic grinding and polishing tool has the advantages, further, that a continuous rotary motion is imparted to the grinding and polishing tools; second, that the motion of the tool may be readily reversed by the simple turning of the intermediate sleeve at the upper end of the casing through an angle of one hundred and eighty degrees, and, thirdly, that the tool can be conveniently controlled while at work and stopped by a short turn of the air-controlling sleeve by the attendant.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A pneumatic grinding and polishing tool, consisting of a tubular spindle for the compressed air, a casing attached to the lower end of said spindle, a paddle-wheel in said casing, having a shaft journaled at the lower end of said spindle, air-supply channels in the spindle and casing for supplying air to diametrically opposite sides of the paddle-wheel, outlet-ports in the casing adjacent to the supply-channels, reversing means for supplying air to one or the other of said supply-channels, and a polishing or grinding tool attached to the lower end of the shaft of the paddle-wheel, so that the spindle-shaft and tool are alined, substantially as set forth.

2. A pneumatic grinding and polishing tool, consisting of a tubular spindle, a casing attached to the lower end of said spindle, a paddle-wheel in said casing, the shaft of which is supported in bearings of the casing, a grinding or polishing tool attached to the lower end of the paddle-wheel shaft, supply-channels connecting the center bore of the spindle with the interior, outlet-ports at opposite sides of the casing, a reversing mechanism interposed between the upper end of the casing and the spindle so as to supply air under pressure to one or the other supply-channels, and means for locking the reversing mechanism in register with either one of the supply-channels, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JOHN W. BIRKENSTOCK.

Witnesses:
PAUL GOEPEL,
JOSEPH H. NILES.