No. 694,981. Patented Mar. 11, 1902.

J. T. McGRATH.

PNEUMATIC DRILL.

(Application filed Nov. 24, 1900.)

(No Model.)

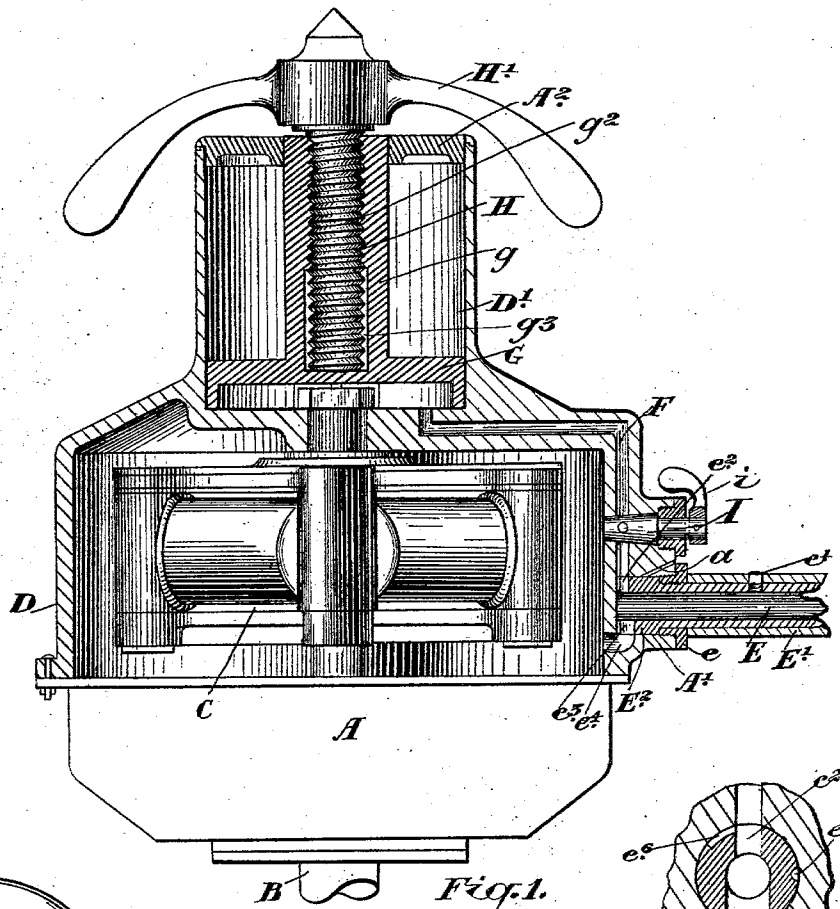


Fig. 1.

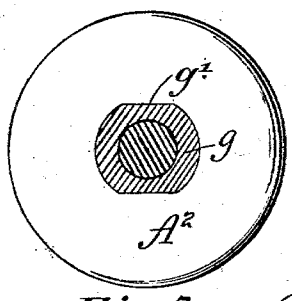


Fig. 5.

Fig. 3.

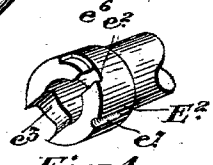


Fig. 4.

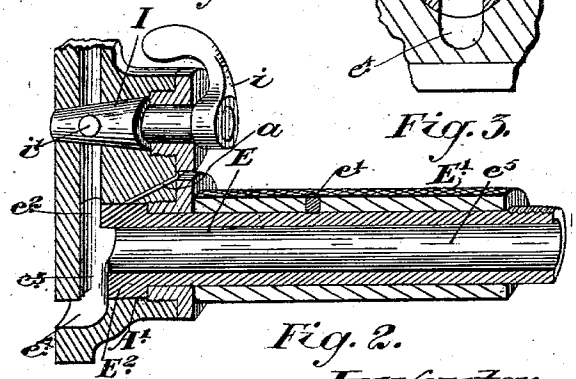


Fig. 2.

Witnesses.

H. J. S. Geering.

H. L. Trumble.

Inventor:

John T. McGrath.

by Fetherstonhaugh & Co.

Atty's

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN T. McGRATH, OF STRATFORD, CANADA.

PNEUMATIC DRILL.

SPECIFICATION forming part of Letters Patent No. 694,981, dated March 11, 1902.

Application filed November 24, 1900. Serial No. 37,668. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. McGRATH, of the city of Stratford, in the county of Perth, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Pneumatic Drills, of which the following is a specification.

My invention relates to improvements in pneumatic drills; and the object of the invention is to devise a pneumatic feed for the drill which will take the place of the present screw-feed and which may be regulated at a nicety, so as to regulate the speed of the feed as may be required, this depending, of course, upon the class of metal which is to be drilled; and it consists, essentially, of a casing having located therein a branch passage-way connected with the main passage-way, by which air is conveyed for the driving of the cylinders which rotate the drill, such branch passage-way leading into a supplemental cylindrical casing at the top of the main driving-casing, in which is located a piston which is designed to be moved upwardly by the passage of the air through such branch passage-way, such passage of the air and the parts being arranged and constructed in detail as hereinafter more particularly explained.

Figure 1 is a side elevation, mostly in section, showing parts of the drill-driving casing to which my invention relates. Fig. 2 is a sectional perspective detail of the main operating portions for controlling the branch passage-way. Fig. 3 is a sectional end view through the branch passage-way and main passage-way. Fig. 4 is a perspective detail of the enlarged end of the main tube. Fig. 5 is a detail of the top of the supplemental cylindrical casing.

In the drawings like letters of reference indicate corresponding parts in each figure.

A is the casing, and B the drill.

C is the cylindrical driving mechanism, which is of the common form used in pneumatic drills, such mechanism being located within a chamber D, as indicated.

E is a tube which extends into a circular recess A′ in the upper portion of the casing A, which is shown in section. The tube E is secured in position by means of the screw-nut *e*, which is internally threaded to fit in the corresponding thread in the recess A′ and internally threaded, so as to fit on the correspondingly-threaded end of the tube. A nurled sleeve E′ is provided, which is suitably fastened in the tube E by means of the screw-pin *e*′.

The tube E is provided with an enlarged end E^2, in which is formed a small notch e^2, communicating with the branch passage-way F, and enlarged notch e^3, communicating with the extension e^4 of the main passage-way e^5, formed by the tube, such extension passage-way e^4 extending into the chamber D and being designed to convey the air, so as to rotate the cylindrical driving mechanism C. It will be noticed that the small notch e^2 is provided at the periphery with a laterally-extending notch e^6. I also provide in the periphery of the enlargement E^2 a longitudinally-extending notch e^7, which is designed to communicate with the oblique passage-way *a*, leading through the casing D, for a purpose which will hereinafter appear.

The passage-way F leads, as will be seen in the drawings, to the bottom of a cylindrical chamber D′ to a point beneath the piston G, which is provided with an extension-sleeve *g*, which extends through the head A^2 of the cylindrical chamber D′. It will be noticed that flat sides *g*′ are formed on the end of the sleeve *g*, and the sleeve is held from rotating by the flat-sided end of the sleeve *g*, extending into a corresponding hole in the head A^2.

H is a screw-spindle, which is provided with the usual manipulating-wheel H′. The screw-spindle extends into a correspondingly internally threaded hole g^2 in the sleeve *g*. The bottom portion g^3, however, of the hole g^2 is not threaded, as will be seen.

Intermediate of the length of the passage-way I provide a faucet or stop-cock I, which is operated by handles *i*, such faucet being provided with the usual cross-hole *i*′, and when the handle is turned the position of such hole will control the supply or limit the supply, as desired, of the air through the branch passage-way F into the chamber D′.

The main pressure of air is conducted

through the passage-way of the tube e^5 and the extension passage-way e^4 to the main driving mechanism C, hereinbefore described. This pressure of air, however, is simply utilized for rotating the drill. By turning the sleeve e' so that the notches e^2 and e^3 are vertical to each other and opposite their respective passage-ways e^4 and F, it will be seen that the air will pass also into the branch passage-way F, and by turning the faucet I ever so little an upward movement will be imparted to the piston G, thereby imparting a down pressure to the drill, as of course the upper point of the spindle G is stationary, as is well understood in drills of this class. When the piston G has been forced to the limit of its upward stroke, so as to give the hole its full depth, the drill may be given a still increased depth by manipulating the handles H', so as to lower the drill still farther, as may be required. It will thus be seen that I have in reality the advantages of a pneumatic feed as well as a hand-feed in one and the same drill.

The exact rapidity of feed may of course be regulated by a faucet I. When the piston G has been forced the limit of its stroke, the sleeve E' may be turned so as to bring the notch e^7 opposite the oblique passage-way a, whereupon the supply of air to the drill will be shut off and the air will escape from the feed, thus allowing of the piston G to assume its normal position. Should, however, it be desired when the drill is being fed pneumatically to slacken the speed of rotation of the drill, this may be accomplished by giving the sleeve E' a partial turn, so as to bring the tube E and lateral extension e^6 of the passage-way e around slightly, thereby allowing the air still to pass through the branch passage-way F to provide for the feed. The opening e^3 is correspondingly moved circumferentially, so that the orifice leading to the extension passage-way e^4 is diminished as may be desired.

Of course the form of the casing and the means for driving the drill may be of a different construction than that generally outlined in the drawings; but it will be understood that I can change the construction and position of my supplemental piston and cylinder, which is shown at the top in the present instance, to accommodate itself to any form of construction or drive of drills, and this, too, without departing from the spirit of my invention.

What I claim as my invention is—

1. In combination, the casing, the drill-spindle and driving means therefor, an air-pipe for supplying compressed air to said driving means, a cylinder carried by said casing, a piston working therein carrying a feed-spindle and a branch conduit from said air-pipe to said cylinder, substantially as described.

2. In combination, the casing, a drill-spindle with driving means therefor located within the casing, an air-pipe for supplying compressed air to operate said driving means, a cylinder axially in line with said drill-spindle and forming a part of said casing, an air-conduit from said air-pipe to said cylinder, and a feed-spindle adjustably connected to said piston, substantially as described.

3. The combination with the casing having suitable pneumatic driving means located therein and the air-tube leading thereto provided with an extension passage-way leading to the main driving means and a branch passage-way and a minor cylindrical chamber to which such passage-way leads, of the piston and sleeve thereof provided with flat upper sides, the head of the cylinder having a corresponding recess to receive the end of the sleeve, the screw-spindle extending into the wheel and the operating-wheel for the same and means for controlling the supply of air through the branch passage-way as and for the purpose specified.

4. The combination with the casing and the driving means and the feeding means located therein and the branch passage-way and extension passage-ways formed in the casing and leading to the respective chambers of the driving mechanism and the feeding means, of a tube having an enlarged head and a small notch to connect with the branch passage-way and an enlarged notch to connect with the extension passage-way and means for controlling the supply of air through the branch passage-way as and for the purpose specified.

5. The combination with the casing and the driving means and the feeding means located therein and the branch passage-way and extension passage-ways formed in the casing and leading to the respective chambers of the driving mechanism and the feeding means, of a tube having an enlarged head and a small notch to connect with the branch passage-way and having a lateral circumferential extension and an enlarged notch to connect with the extension passage-way and means for controlling the supply of air through the branch passage-way as and for the purpose specified.

6. The combination with the casing and the driving means and the feeding means located therein and the branch passage-way and extension passage-way formed in the casing and leading to the respective chambers of the driving mechanism and the feeding means, of a tube having an enlarged head and a small notch to connect with the branch passage-way and having a lateral circumferential extension and an enlarged notch to connect with the extension passage-way, said head having a supplemental longitudinal notch and said casing having an oblique passage-way with which the said notch is designed to be brought into communication and means for controlling the supply of air through the branch passage-way as and for the purpose specified.

7. In a device of the class described, the

combination with the driving means and the feeding means and the extension passage-way and the branch passage-way leading respectively thereto, of the tube having an enlarged head with end notches as shown, such tube fitting in a recess in the casing and the nut for securing such tube in position, so as to permit of its turning as and for the purpose specified.

JOHN T. McGRATH.

Witnesses:
M. PHELAN,
J. C. MAKINS.