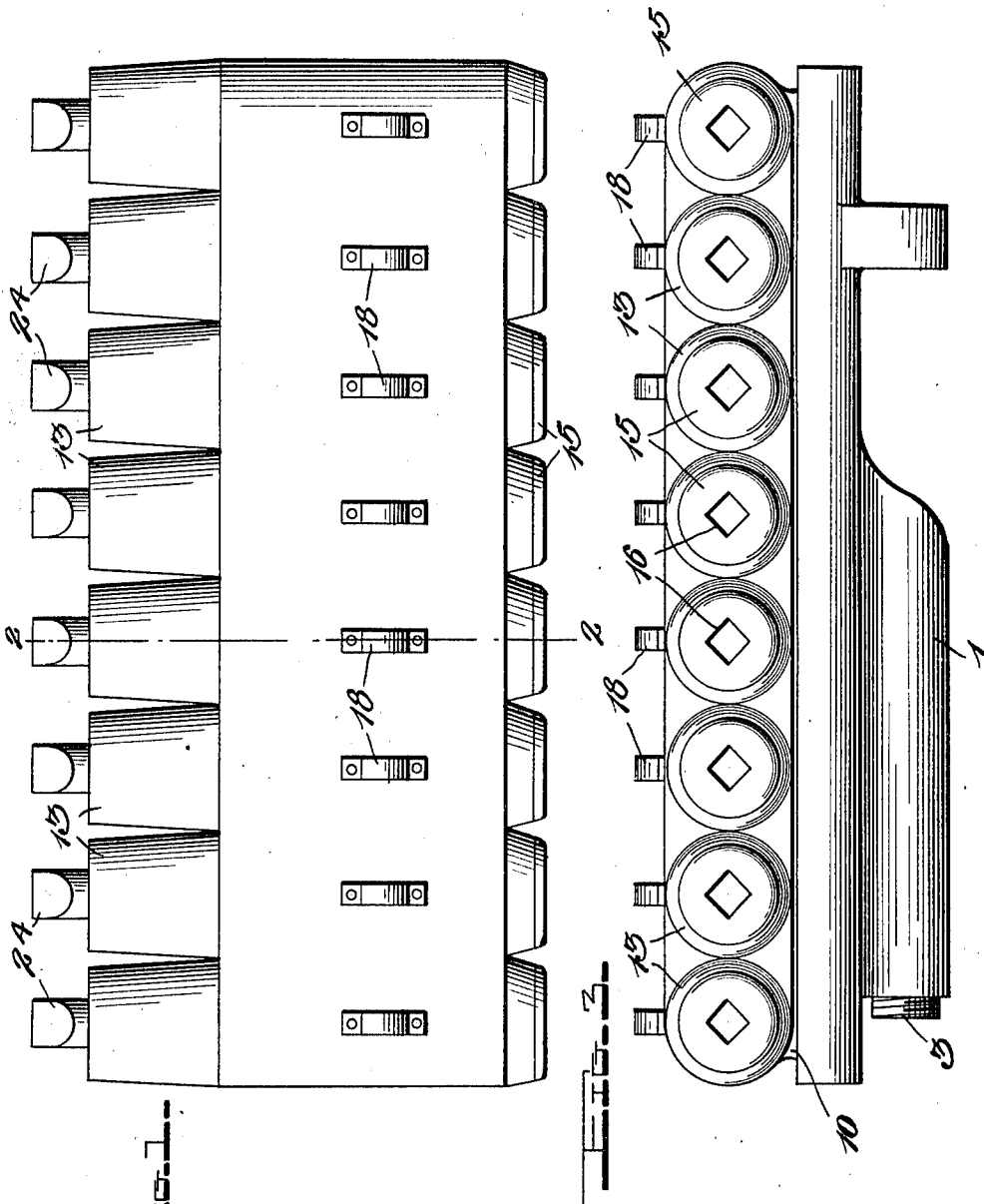


W. R. COLLINS.
 DRILL SUPPORTING MECHANISM.
 APPLICATION FILED APR. 8, 1912.

1,061,451.

Patented May 13, 1913.

2 SHEETS-SHEET 1.



Inventor

W. R. Collins,

Witnesses

Chas. L. Grisetawer. By

A. B. Norton.

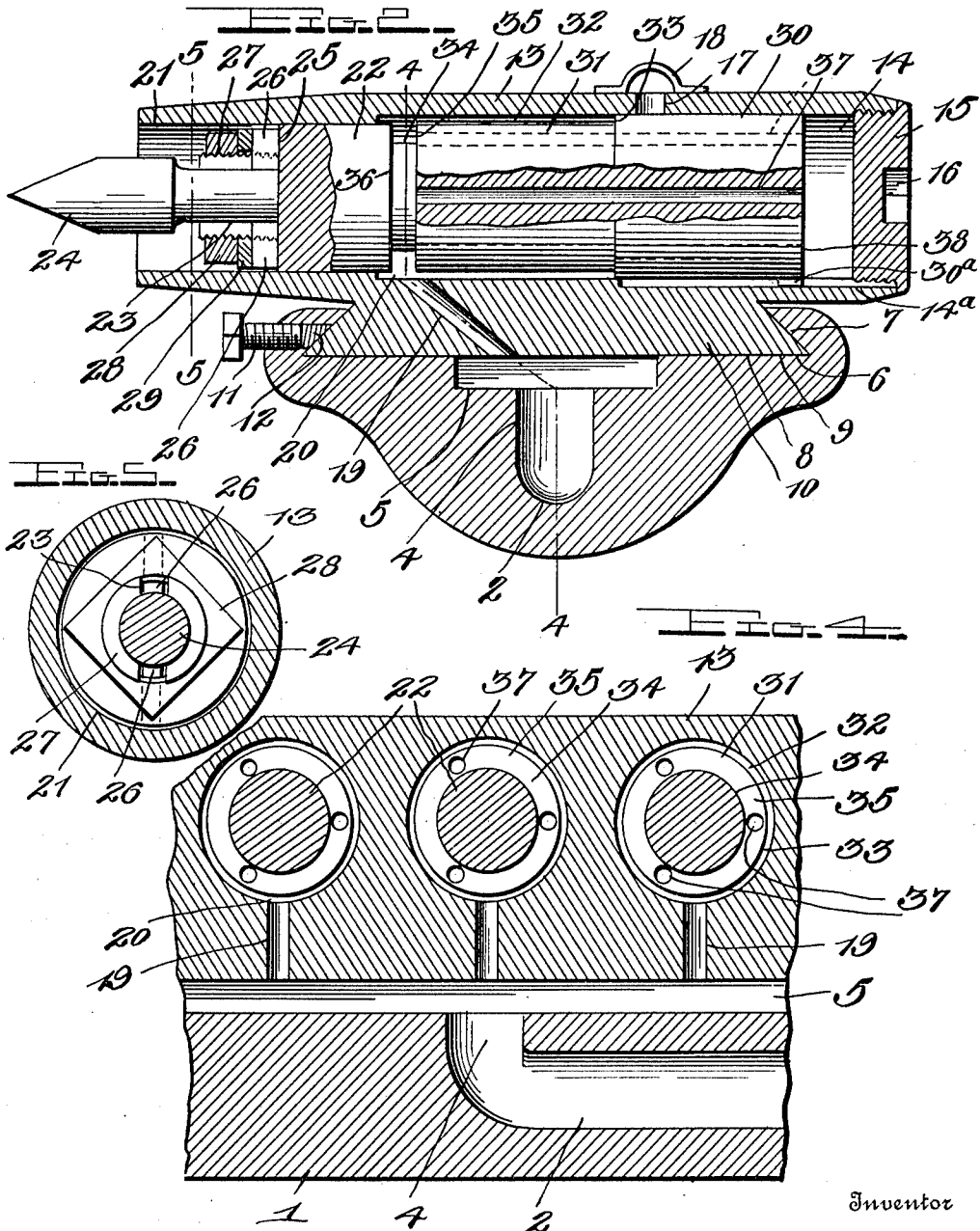
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Attorney

UNITED STATES PATENT OFFICE.

WILLIAM R. COLLINS, OF CHICAGO, ILLINOIS.

DRILL-SUPPORTING MECHANISM.

1,061,451.

Specification of Letters Patent.

Patented May 13, 1913.

Application filed April 8, 1912. Serial No. 689,412.

To all whom it may concern:

Be it known that I, WILLIAM R. COLLINS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Drill-Supporting Mechanism, of which the following is a specification, reference being had to the accompanying drawings.

10 This invention relates to drill supporting mechanism and the object of the invention is a compact and efficient drill carrying and operating mechanism in which a gang of drills is operated without valves or valve gear.

15 The invention as hereinafter particularly claimed will be readily understood from the following detail description thereof taken in connection with the accompanying illustrative drawings wherein is shown a preferred and also a modified embodiment of the invention.

20 In these drawings—Figure 1 is a top plan view; Fig. 2 is a vertical transverse section on the line 2—2 of Fig. 1; Fig. 3 is a rear elevation of the form of construction shown in Figs. 1 and 2, Figs. 4 and 5 are sectional details taken on the lines 4—4 and 5—5 respectively of Fig. 2.

25 Referring more particularly to the drawings, wherein like reference numerals designate corresponding parts throughout, 1 is the bed plate of the drill carrying body which is provided with a longitudinal passage 2 for compressed air or steam, the term pneumatic used hereinafter having reference broadly to pressure fluid whether steam, air or other gaseous pressure medium. The outer end of the passage 2 is provided with a coupling 3 by which it is connected to a suitable source of pressure fluid supply, usually a chamber within the frame or the rotary head of the tunneling machine upon which the drill is used. This passage 2 extends preferably throughout one half of the length of the bed plate and is connected at its end by a short vertical channel 4 with an air chamber 5 extending longitudinally of the bed plate. The upper face of the bed plate is incut to form a dove tail groove 6 having upwardly converging walls 7. The bottom of this groove at 8 is ground smooth to form a tight joint with the bottom surface of the dove tail tongue 10 formed on the lower portion of the drill body. The tongue 10 is adapted to be slipped lengthwise into

the dove tail groove 6, the meeting faces 8 and 9 forming an air tight joint when the set screw 11 is screwed home forcing the beveled plug 12 against the inclined side of the tongue and thereby forcing the drill body in the opposite direction against the inclined wall 7 and cooperating therewith to seat the tongue 10 firmly upon the bottom of the groove 6.

60 The drill body 13 is preferably made of a solid casting bored out transversely at intervals to form the drill cylinders 14 into which cylinder heads 15 are screw threaded at the rear and provided with angular recesses 16 for the application of a wrench or the like. The upper wall of the drill body is provided at intervals with exhaust ports 17 leading from each of the cylinders just to the rear of a medial line, the exhaust ports being preferably provided with deflector hoods 18. Inlet channels 19 lead from the air chamber 5 to each of the cylinders 14 entering the same at the inlets 20 at the forward end thereof. The transverse bore through the cylinder body is slightly reduced in size from the forward end of the cylinder to the face of the cylinder body forming a cylindrical guide 21 within which the piston extension 22 travels. This extension 22 is cored out at 23 to receive the shank of the drill or other tool 24 and upon the opposite sides of this cavity 23 are provided longitudinal grooves 25 within which the studs 26 carried by the tool shank engage to prevent relative rotary movement. The piston extension 22 is further reduced and threaded at 27 to receive the clamping collar 28 by which the drill shank is secured in place, the collar 28 bearing upon an interposed washer 29 which in turn bears against the stud 26.

90 The piston proper is composed of a rear portion 30 of a diameter to snugly fit within the cylinder and of a forward portion 31 of slightly reduced diameter to provide an annular interspace 32 between the same and the cylinder walls which interspace is bounded at the rear by the annular shoulder 33. The forward end of the piston is provided with an annular groove 34 bounded on the rear by the wall 35 and in front by the wall 36. The piston is further provided with a plurality of longitudinal bores 37 extending from the grooves 34 through the body of the piston to the rear face of the same at 38.

110 The location of the groove, of the inlet port and of the exhaust port and the con-

formation of the piston are such that when the piston is in its rearmost position the shoulder 33 will coincide substantially with the front wall of the exhaust port 17 and the groove 34 will register substantially with the inlet port 20. It will thus be seen that, pressure fluid being supplied through the passage 2 and from it to the chamber 5, such pressure fluid will be admitted through the channels 19 and the inlet ports 20 to the groove 34 and thence by means of the bores 37 to the rear face of the piston driving the same forward by reason of the excess area exposed to the pressure fluid at the rear of the piston over that exposed at the shoulder 33. As soon as the piston has reached the position wherein the exhaust port is brought into communication with the space at the rear of the piston and the pressure relieved from the piston at that end, the pressure on the shoulder 33 will return the piston thus resulting in a reciprocatory movement of the piston without the use of valves and also doing away with the necessity of cushioning devices, the cushioning effect being obtained from the pressure fluid trapped upon the return stroke between the rear face of the piston and the cylinder head.

The number of cylinders, pistons and tools will depend altogether upon the requirements of the service there being one or many as circumstances may necessitate, the operation being the same under all conditions.

Preferably, the head of the piston is formed with one or more lugs 30^a which work in grooves 14^a formed in the cylinder, whereby the piston is prevented from rotating in the drill cylinder and is limited to a reciprocating movement therein.

Having thus described the invention, what is claimed is:

1. In a device of the character described, a bed plate having an air passage formed therein and provided in its upper face with a dove tail groove, a drill carrier fitted within the said groove, a plurality of cylinders formed as an integral part of and supported by the carrier, the several cylinders each having an inlet port and an exhaust port, the upper face of the bed plate is provided with a feed chamber, means to clamp the carrier upon the bed plate to form an air-tight joint, an air channel leading from the air passage to the feed chamber, branched channels leading from the chamber to the inlet ports of the cylinders,

and a tool bearing piston in each of the cylinders.

2. In a device of the character described, the combination with a bed plate provided in its upper face with a dove-tail groove, an air passage formed within said bed plate, a drill carrier slidably mounted within said dove-tail groove, a plurality of cylinders supported by the drill carrier, the several cylinders each having an inlet and exhaust port, a feed chamber formed within the upper face of the bed plate and communicating with said air passage, the said bed plate having a plurality of diagonally extending channels communicating with said feed chamber and the several inlet ports of the cylinders, and a tool bearing piston in each of said cylinders.

3. In a device of the character described, a bed plate having an air passage formed therein and provided in its upper face with a dove tail groove, a drill carrier, a tongue formed integrally with said drill carrier and slidably mounted within said groove, a beveled plug adjustably mounted within said bed plate and adapted to engage said tongue, a plurality of cylinders supported by the carrier, the several cylinders each having an inlet port and an exhaust port, means of communication between said air passage and the inlet ports of the several cylinders, and a tool bearing piston in each of said cylinders.

4. In a device of the character described, the combination of a bed plate having a longitudinally extending air passage formed therein and terminating adjacent the central portion thereof, the upper face of said bed plate having a dove tail groove, a drill carrier slidably mounted within said dove-tail groove, a plurality of cylinders supported by said carrier, the several cylinders each having an inlet port and an exhaust port, the upper face of said bed plate having a feed chamber formed therein extending parallel with said dove tail groove, a channel leading from said air passage and communicating with said chamber, branched channels leading from said chamber to the inlet ports of the several cylinders, and a tool bearing piston in each of said cylinders.

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

WILLIAM R. COLLINS.

Witnesses:

OLIVER SALENGER,
JOHN R. CLAYPOLE.