

C. JACKSON.
 ROCK DRILL.
 APPLICATION FILED OCT. 17, 1907.

917,731.

Patented Apr. 6, 1909.
 2 SHEETS—SHEET 1.

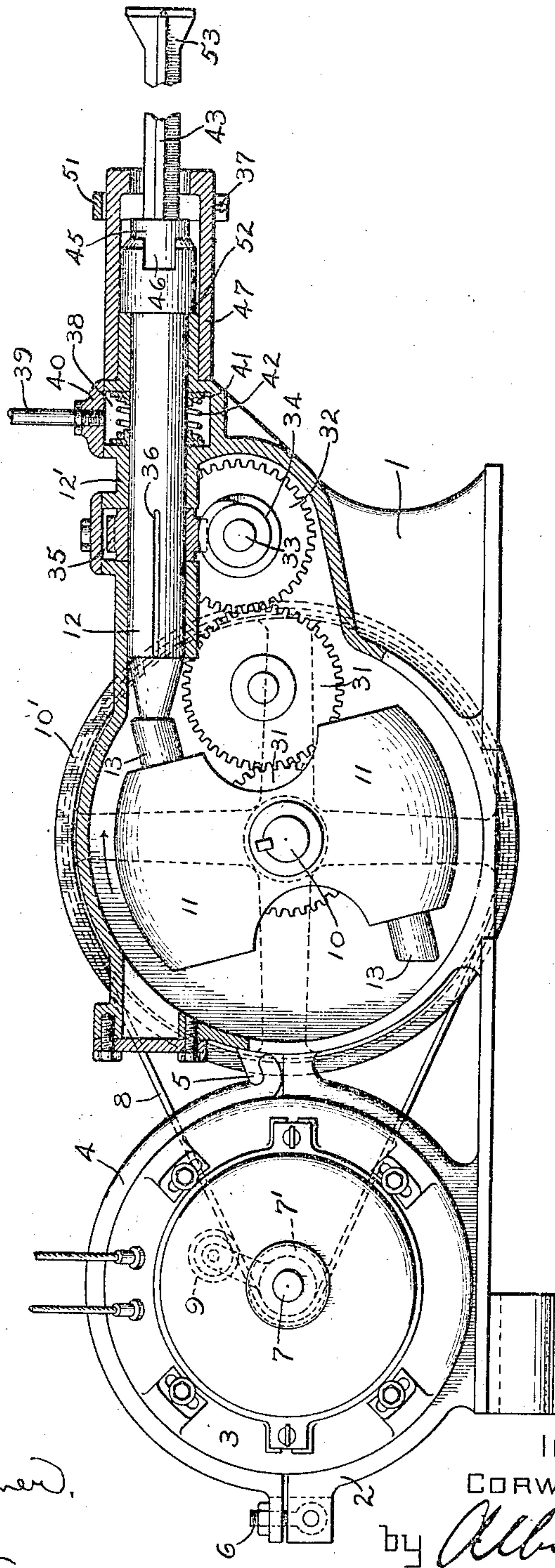


Fig. 1

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2 SHEETS—SHEET 2.

Fig. 2

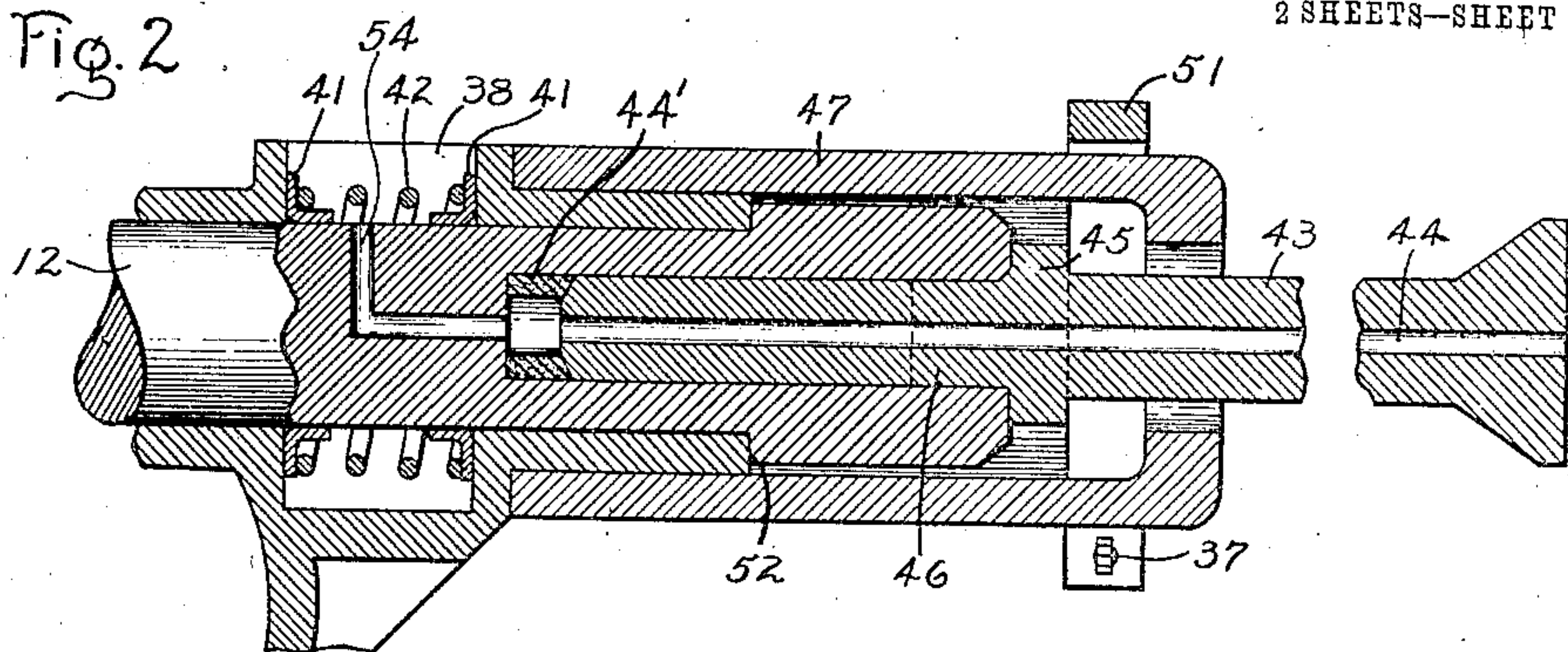


Fig. 3

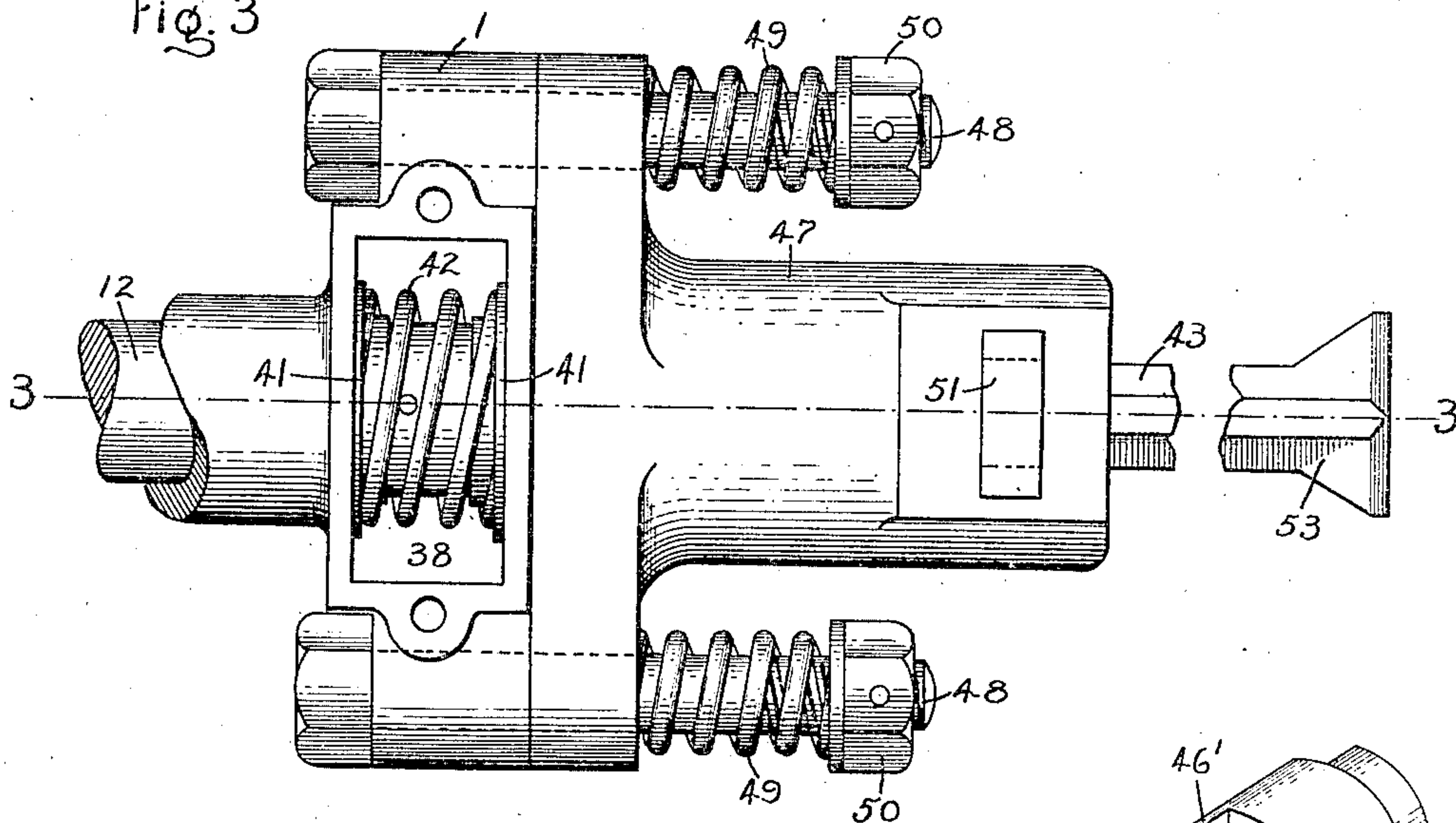


Fig. 4

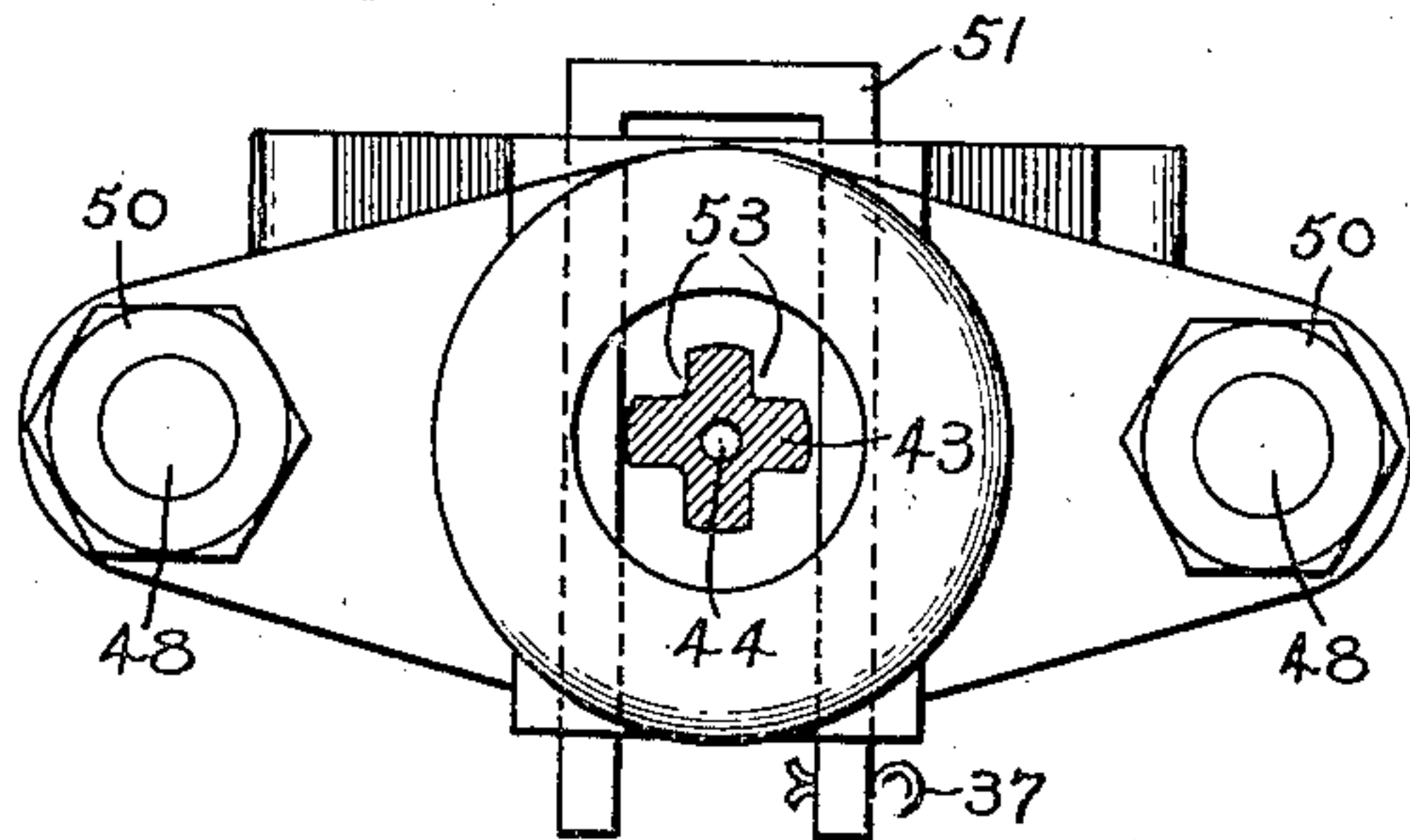
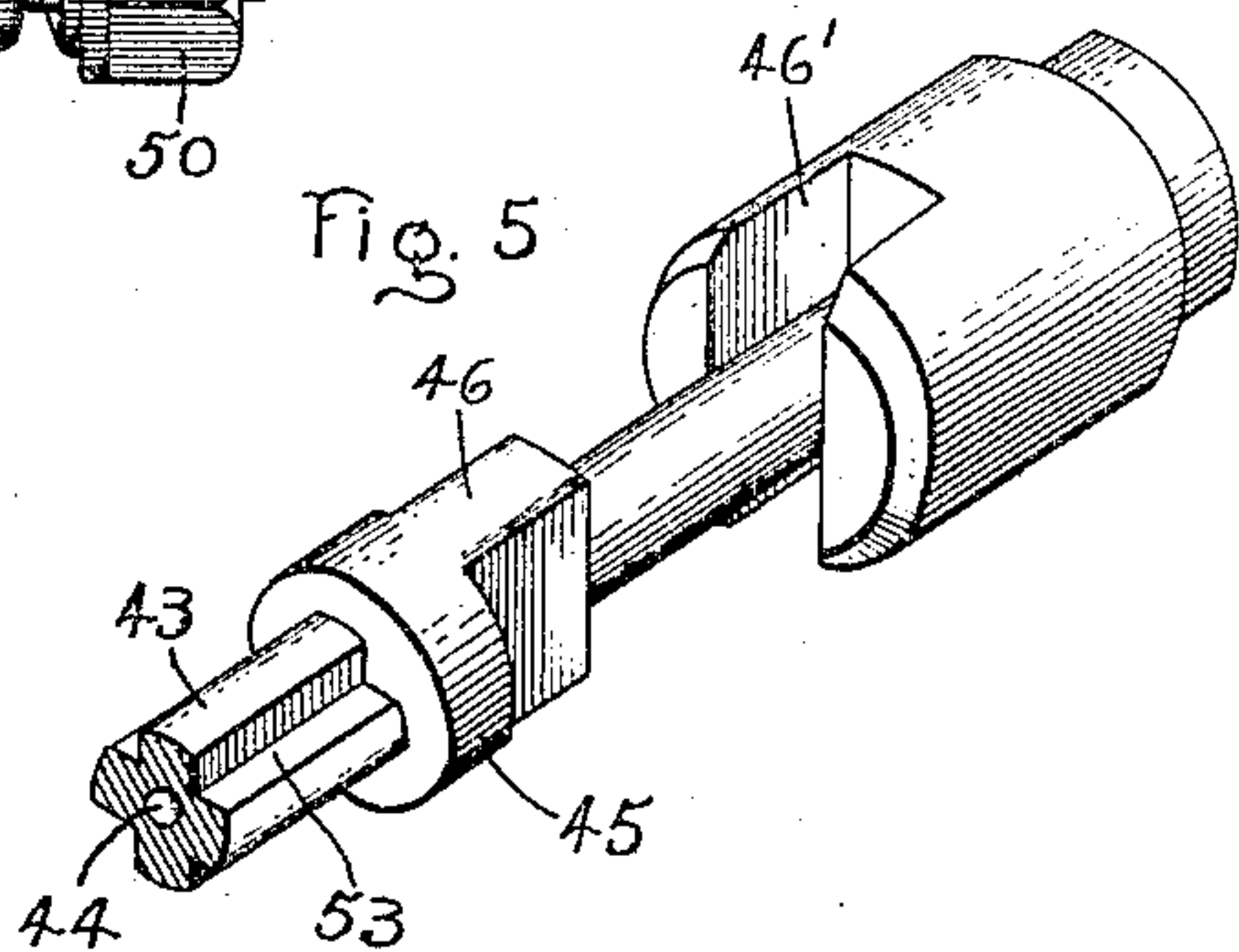


Fig. 5



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UNITED STATES PATENT OFFICE.

CORWILL JACKSON, OF MADISON, WISCONSIN, ASSIGNOR TO NORTHERN ELECTRICAL MANUFACTURING COMPANY, A CORPORATION OF WISCONSIN.

ROCK-DRILL.

No. 917,731.

Specification of Letters Patent.

Patented April 6, 1909.

Original application filed March 10, 1906, Serial No. 305,252. Divided and this application filed October 17, 1907. Serial No. 397,808.

To all whom it may concern:

Be it known that I, CORWILL JACKSON, a citizen of the United States, residing at Madison, county of Dane, State of Wisconsin, have invented certain new and useful Improvements in Rock-Drills, of which the following is a specification.

This is a division of my prior application Serial No. 305,252, filed March 10, 1906.

My present invention relates to mechanism such as rock drills, rock surfacers, riveting machines and the like, in which a tool or device is actuated by hammer blows.

My invention comprises certain novel features of construction and arrangement of a rock drill or similar device in which the hammer may be used.

The various forms of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of my invention, however, and the advantages possessed by it, reference may be had to the accompanying drawing and descriptive matter in which I have illustrated and described one of the forms in which my invention may be embodied.

In the drawings Figure 1 is an elevation partly in section of a rock drill constructed in accordance with my invention; Fig. 2 is a section on the lines 3—3 of Fig. 3; Fig. 3 is a plan view of the tool and tool holding means; Fig. 4 is an end elevation showing the movable cross-head and tool with the latter in section; and Fig. 5 is a perspective view of a portion of the drill bit and the piston with which it is connected.

Referring to the drawing, 1 represents the frame of a rock drill proper which is adapted to be slidably mounted on suitable supports in the usual manner. The rear end of the frame 1 is provided with a curved seat 2 in which the field ring 3 of an electric motor is mounted. The field ring is clamped in place in the seat 2 by means of an arc shaped piece 4 which engages with a hook or jaw 5 formed for the purpose on the frame at one side of the motor, and with a bolt and nut fastening device 6 secured to the seat 2 at the opposite side of the motor.

The armature shaft 7 of the motor drives a shaft 10 which extends parallel to the armature shaft 7 by means of a belt 8, a belt tightener 9 and pulleys 7¹ and 10¹. On the

shaft 10 is keyed a somewhat massive member 11 which when in motion has considerable momentum. Floating hammer members 13 are adapted to deliver blows to the adjacent end of a piston member 12 slidably mounted in a tubular portion 12¹ of the casing 1, as clearly described in my previous application, of which this is a divisional case.

The piston 12 is provided with diametrically opposed longitudinally extending slots 36 into which extend keys or ribs of a gear 35 mounted upon the piston. The gear 35 meshes with a worm 34 keyed to the shaft 33 journaled in the frame and extending parallel to the shaft 10. The shaft 33 also has mounted upon it a gear wheel 32 which is geared to the shaft 10 through gears 31. The gear wheel 32 drives the shaft 33 through a friction clutch not shown.

A chamber 38 is formed in the barrel portion of the casing surrounding the body of the piston 12 through which a fluid is admitted from a suitable reservoir or pump through the pipe 39 connected to the cover member 40. Preferably the fluid employed is water, though air may be used under some circumstances. To prevent the escape of fluid entering the chamber 38 along the surface of the piston, packing members 41 are employed which are held in place by a helical spring 42.

As shown in Fig. 2, the forward end of the piston member 12 is provided with a socket into which the hollow drill bit or tool 43 is inserted. The passage 54 in the piston establishes communication between the chamber 38 and the bore 44 of the tool. A tubular packing 44¹ is provided for preventing leakage of the fluid out of the tool receiving socket.

The tool 43 is provided with a shoulder 45 which abuts against the end of the piston 12 and with an enlarged portion 46, substantially rectangular in cross section, which enters a corresponding recess 46¹ in the end of the piston 12. The outer end of the piston 12 is located within a chambered cross-head member 47 which is connected to the casing 1 by bolts 48. As shown, helical springs 49 surround the bolts 48 and extend between the forward surface of the cross-head member 47 and nuts 50 carried by the forward ends of bolts. To secure the drill bit in place a U-shaped device 51 is employed which passes through slots formed for the purpose

in the forward end of the cross-head member and straddles the drill bit or tool in front of the shoulder 45. When the device 51 has been placed in position a split pin 37 is put
 5 through a hole in one end of the leg of the U so as to keep the device 51 from being jarred out by the hammer blows of the drill. In the stationary position of the apparatus the springs 49 hold the cross-head in the posi-
 10 tions shown clearly in Figs. 1 and 3, at which time the piston 12 is at the backward limit of its movement with the shoulder 52 formed on it engaging the forward end of the barrel portion of the casing 1 surrounding the
 15 piston. The key or fastening member 51 is shaped and arranged to hold the drill bit firmly in the socket in the piston. This device for holding the tool is particularly advantageous as no driving fits are made, and
 20 consequently no hammering is necessary in removing the tool. The tool may be removed by simply removing the split pin 37 and the U-shaped device 51.

In the normal operation of the device the
 25 motor 7 rotates the shafts 10 and 31 and causes the hammer members to deliver rapid blows upon the inner end of the piston 12. The rotation of the shaft 10 causes the gear wheel 32 to revolve, and through the friction
 30 clutch the corresponding rotation of the worm wheel 34 is obtained. This results in a slow rotation of the piston 12 and consequently the tool 43. At each blow on the inner end of the piston, the piston and drill bit
 35 are advanced more or less depending upon the nature of the material upon which the tool is working. After each blow the piston is moved backward to the position shown in Fig. 1 by the springs 49. It will be under-
 40 stood that the frame 1 is advanced as the material upon which the tool is operating is worn away.

The fluid entering through the pipe 39 passes outward to the working ends of the
 45 tool and causes the chips formed by the tool to be forced away from its cutting edge. With the tool shown they may escape through the passages 53 formed in the tool. Should the tool not be in contact with the
 50 work at the instant the piston is given the hammer blow, the entire energy of the blow is taken up by the buffer springs 49.

The construction hereinbefore described and illustrated has been found in actual prac-
 55 tice to give excellent results from the standpoint of durability and effectiveness. It will be obvious, however, to those skilled in the art that changes may be made in the form of my invention without departing
 60 from the spirit thereof and that certain features of my invention may be used without a corresponding use of other features.

I do not wish the claims hereinafter made to be limited to the particular embodiment
 65 of my invention shown and described more

than is made necessary by the state of the art.

What I claim as new, and desire to secure by Letters Patent of the United States, is,—

1. In a rock drill, a piston having a tool 70 socket formed in it, a tool located in said socket and a spring-pressed cross-head for holding the tool in the socket.

2. In a rock drill, a piston having a socket formed in one end, a tool in said socket, a 75 cross-head holding the tool in position, means for periodically imparting a forward movement to the piston and thereby to the tool, and resilient means for supporting the cross-head, said means being put under ten- 80 sion by the forward movement of the piston and serving to return the tool and piston after each forward movement.

3. In a rock drill, a movable piston having a tool socket formed in it, a tool located in 85 said socket and arranged to move with said piston, and a spring-pressed cross-head for holding the tool in the socket.

4. In a rock drill, a piston having a tool socket formed in it, a tool located in said 90 socket, and a spring-pressed cross-head for holding the piston and the tool against relative movement.

5. In a rock drill, a tool, a movable piston for operating said tool, and a spring-pressed 95 cross-head for holding the piston and tool together.

6. In a rock drill, a frame, a piston movable in the frame, a tool carried by the piston, and a cross-head yieldingly connected to 100 said frame and arranged to hold the tool to the piston.

7. In a rock drill, a spring-pressed cross-head member having slots, a movable piston 105 having a tool socket formed therein, a tool fitting in said socket and having a shoulder, and a U-shaped device passing through said slots and straddling said tool in front of said shoulder.

8. In a rock drill, a spring-pressed cross- 110 head member having slots, a movable piston having a tool socket formed therein, a tool fitting in said socket and having a shoulder, a U-shaped device passing through said slots and straddling said tool in front of said 115 shoulder, and means for holding said U-shaped device in said position.

9. In a rock drill, a member having slots, a movable piston having a tool socket formed in it, a tool having a shoulder, and 120 a device passing through said slots and straddling said tool in front of said shoulder, thereby holding said tool in said socket.

10. In a rock drill, a member having slots, a movable member therein having a tool 125 socket formed in it, a tool having a shoulder, and a device passing through said slots and straddling said tool in front of said shoulder, thereby holding said tool in said socket.

11. In a rock drill, a member having slots, 130

a movable member therein having a tool
socket formed in it, a tool having a shoulder,
a U-shaped device passing through said slots
and straddling said tool in front of said
5 shoulder, thereby holding said tool in said
socket, and means for holding said device in
position.

In witness whereof, I have hereunto set
my hand this 14th day of October, 1907.

CORWILL JACKSON.

Witnesses:

EMIL A. LAMBRECHT,
H. L. MORRIS.