

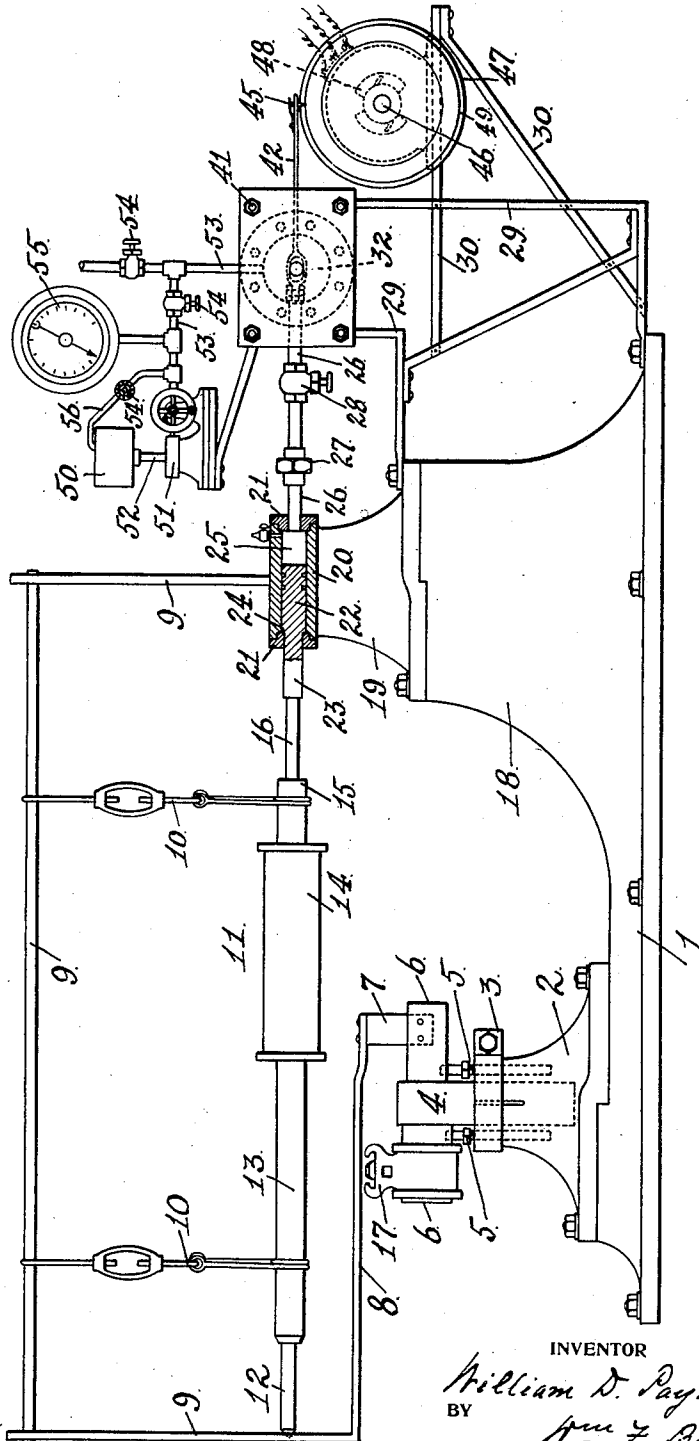
W. D. PAYNTER.
ROCK DRILL TESTER.
APPLICATION FILED AUG. 7, 1912.

1,062,662.

Patented May 27, 1913.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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S. Constance.

INVENTOR

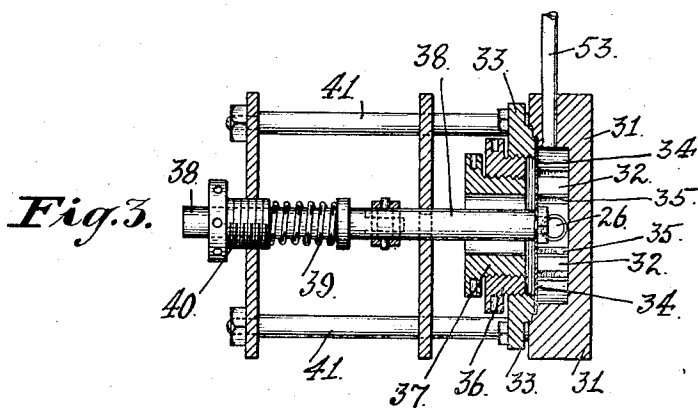
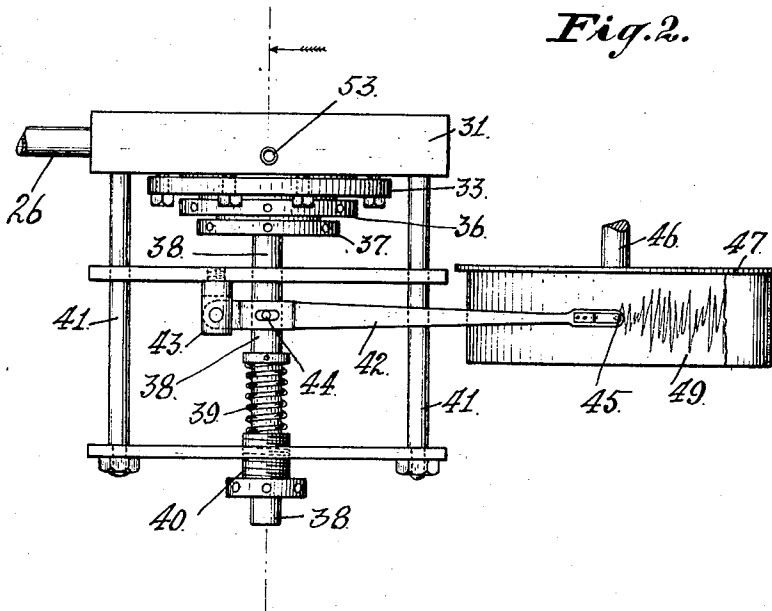
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

WILLIAM D. PAYNTER, OF GRASS VALLEY, CALIFORNIA.

ROCK-DRILL TESTER.

1,062,662.

Specification of Letters Patent.

Patented May 27, 1913.

Application filed August 7, 1912. Serial No. 713,794.

To all whom it may concern:

Be it known that I, WILLIAM D. PAYNTER, a citizen of the United States, residing at Grass Valley, in the county of Nevada and State of California, have invented certain new and useful Improvements in Rock-Drill Testers, of which the following is a specification.

My invention relates to the class of instruments or appliances for testing the efficiency of pneumatic tools, and it concerns particularly a device for testing the frequency and force of the blows of a rock drill in order to determine its condition, and its adaptability for any given work.

The object of my invention is to provide a simple, efficient and accurate appliance for this purpose; and to this end my invention consists in the novel testing device which I shall now fully describe by reference to the accompanying drawings, in which—

Figure 1 is a side view of the tester, showing it in use with a stopping or hammer drill, the general outline of which is shown. Fig. 2 is a plan view, enlarged, of the diaphragm holder, its plunger, the pencil and the chart-drum. Fig. 3 is a sectional view through the diaphragm holder.

In Fig. 1, the base 1 has secured to it at one end a column 2 which is split in order to secure within it, by means of the clamp 3, a vertically adjustable post 4, which is movable up or down by means of the screws 5, bearing under side extensions 6 of said post. Secured to one of these side extensions is an arm 7 to which is secured the base member 8 of a light frame 9. From this frame is suspended by adjustable hangers 10 a rock drill 11, which from its general outline will be recognized as of the stopping or hammer-drill type, the feed piston rod 12 being set in one end of the frame 9. Of this drill, 13 is the feed cylinder, 14 is the main cylinder, 15 is the chuck and 16 is the drill bit, or more correctly a bar which is substituted for the drill bit when the machine is being tested. The parts heretofore described form no part of the tester proper, and are here shown simply as an illustration of suitable means included in the whole apparatus for holding and presenting this kind of a drill to the tester. Following out this same idea, I have here shown as secured to the other extension 6 of the post 4 the usual form of clamp indicated by 17 for holding an ordinary rock drill by its usual bottom boss. By the ad-

justment of the post 4, any drill carried by it may be brought into proper relation to the tester.

The base 1 has rising from its other end a column 18 which supports a bed-block 19 in the upper portion of which is formed a cylinder 20, to the ends of which are bolted the heads 21. Within the cylinder 20 is a piston 22, the stem 23 of which is reduced, thus forming a limiting shoulder at 24 for the piston; and said stem extends through one head 21 of the cylinder and its end is in line with and is adapted to receive the blow of the drill bar 16, though it is not connected with said bar. With the bore 25 of the cylinder 20 in advance of the piston 22, a pipe 26 screwed into the other cylinder head 21 communicates; said pipe 26 thence extends with a coupling at 27 and a cut-off valve at 28, to and opens into the diaphragm chamber in the line of a radius of said chamber.

The various parts of the holder in which the diaphragm chamber is formed are carried by a frame work 29 secured to the base 1 and column 18, and this frame work carries other frame members 30 which support the chart drum and its driving motor. The diaphragm holder is composed of a plate 31 which on its inner side is recessed to form the chamber 32; and an annular cap plate 33 bolted to the inner face of the plate 31 and clamping the diaphragm 34 between them. This diaphragm is of sheet steel, highly tempered. Stud 35 projecting from the chamber floor of the holder plate 31 bear against the obverse face of the diaphragm, while in conjunction with its reverse face there is screwed into the annular holder or cap plate 33 a stop ring 36 and also there is screwed into this stop ring a second independently adjustable stop ring 37. These, by setting up against the reverse face of the diaphragm, or withdrawing therefrom, serve to vary the functional area of the diaphragm to suit the frequency and intensity of the blows of the particular rock drill being tested.

Secured to the center of the diaphragm 34 by a fixed connection, such as is afforded by passing through it shouldered on one side and receiving a nut on the other side is a slide-rod 38. Upon this rod, not as a control but merely as a sensitive assistance, is a spring 39, the tension of which is regulated by a nut 40. Bolts 41 secure all these parts in a general frame.

42 is a multiplying lever. One end of this

lever is pivoted in a fixed lug at 43. Beyond this fulcrum point, the lever is connected with the slide rod 38 by a pin 44. The other extremity of the lever 42 carries a pencil 45.

5 Mounted upon a shaft 46 is a time drum 47 which is rotated at a given rate by suitable means, as, for example, by an electric motor indicated by 48. Upon this drum is a chart 49, and the pencil 45 plays on the chart.

10 50 is a tank for non-compressible fluid, such, in practice, as oil.

51 is a pump taking oil from the tank by a pipe 52. The pump 51 communicates through a pipe system 53 with the diaphragm chamber 32. Into this system is let suitable cocks 15 54, and a pressure gage 55.

56 is a pipe leading back from the system 53 to the tank 50.

It remains only to be stated that oil fills 20 the bore 25 of the cylinder 20, the pipe 26 and the diaphragm chamber 32.

The operation of the tester is as follows:—
The movements of the piston 22 under the blows of the drill bar 16 are transmitted 25 through the body of oil to the diaphragm 34 which in turn transmits them to the slide rod 38, the latter by its positive connection with the diaphragm working in perfect harmony with said diaphragm. These move- 30 ments of the rod are conveyed to the multiplying lever 42, the pencil 45 of which makes marks on the chart 49. The number of these marks present a record of the frequency of the blows and their length indicates the 35 force or intensity of said blows. Now, in order to read the length of these marks in terms of pressure, the cut-off valve 28 is shut, and the pump-pipe-system 53 is opened. The pump 51 is started and a pres- 40 sure is brought upon the diaphragm 34, sufficient to drive the pencil 45 through a marking distance equivalent in length to any mark with which it is to be compared, and the length of the mark thus obtained is 45 then read in pounds pressure on the gage 55.

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

1. A rock-drill tester comprising a conduit 50 confining a body of non-compressible fluid; a piston adapted to receive the blows of the drill-bar and operating against one end of the fluid body; a diaphragm exposed to said fluid body at its other end; a slide rod operated by said diaphragm; a pencil-carrying 55 multiplying-lever operated by the slide rod, and a chart-carrying time-drum upon which the pencil of the multiplying lever operates.

2. A rock-drill tester comprising a conduit 60 confining a body of non-compressible fluid; a piston adapted to receive the blows of the drill-bar and operating against one end of the fluid body; a diaphragm exposed to said fluid body at its other end; 65 means for varying the functional area of

said diaphragm; a slide rod operated by said diaphragm; a pencil-carrying multiplying-lever operated by the slide rod, and a chart-carrying time-drum upon which the pencil of the multiplying lever operates. 70

3. A rock-drill tester comprising a conduit confining a body of non-compressible fluid; a piston adapted to receive the blows of the drill-bar and operating against one end of the fluid body; a diaphragm exposed to said fluid body at its other end; a slide rod operated by said diaphragm; a pencil-carrying 75 multiplying-lever operated by the slide rod; a chart-carrying time-drum upon which the pencil of the multiplying lever operates, and means for reading the chart in terms of pounds pressure consisting of a cut-off valve in the fluid conduit, an independent conduit for a body of non-compressible fluid, to 80 which the diaphragm may be exposed at will, a pump for said independent fluid body, and a pressure gage in said independent conduit. 85

4. A rock-drill tester comprising a conduit confining a body of non-compressible fluid; a piston adapted to receive the blows of the drill-bar and operating against 90 the end of the fluid body; a diaphragm exposed to said fluid body at its other end; a slide-rod positively connected with said diaphragm to act in harmony therewith; a pencil-carrying multiplying-lever operated by the slide rod, and a chart-carrying time-drum upon which the pencil of the multiply- 95 ing lever operates. 100

5. A rock-drill tester comprising a conduit confining a body of non-compressible fluid; a piston adapted to receive the blows of the drill-bar and operating against the end of the fluid body; a diaphragm exposed 105 to said fluid body at its other end; a slide-rod positively connected with said diaphragm to act in harmony therewith; a spring to assist the movement of the slide-rod and diaphragm; a pencil-carrying multiplying-lever operated by the slide rod, and a chart-carrying time-drum upon which the pencil of the multiplying lever operates. 110

6. A rock-drill tester comprising a cylinder; a piston operating therein and having 115 a stem adapted to receive the blows of the drill bar; a pipe leading from the other end of the cylinder; a chambered holder into which the other end of the pipe leads, the bore of said cylinder, the pipe and the chambered holder being filled with a body of non-compressible fluid; a diaphragm in said chambered holder exposed to the fluid body therein; a slide rod operated by the diaphragm; a pencil-carrying multiplying- 120 lever operated by the slide rod, and a chart-carrying time-drum upon which the pencil of the multiplying lever operates. 125

7. A rock-drill tester comprising a cylinder; a piston operating therein and hav- 130

ing a stem adapted to receive the blows of the drill bar; a pipe leading from the other end of the cylinder; a chambered holder into which the other end of the pipe leads, 5 the bore of said cylinder, the pipe and the chambered holder being filled with a body of non-compressible fluid; a diaphragm in said chambered holder exposed to the fluid body therein; adjustable rings in said holder operating against the diaphragm to vary its functional area; a slide rod operated by the diaphragm; a pencil-carrying multiplying-lever operated by the slide rod, and a chart-carrying time-drum upon which the pencil 10 of the multiplying lever operates. 15

8. A rock-drill tester comprising a conduit confining a body of non-compressible fluid; means affected by the blows of the drill bar for imposing pressure upon one end 20 of the fluid body; a diaphragm exposed to

the fluid body at its other end; means operated by the diaphragm for making record marks of the diaphragm movements; means for cutting off, at will, the pressure of the fluid body on the diaphragm; a second conduit containing a body of non-compressible 25 fluid to which the diaphragm is exposed, a pump having a pressure gage, said pump being arranged to impose pressure upon said second fluid body; and means for cutting 30 off, at will, the pressure of said second fluid body on the diaphragm.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM D. PAYNTER.

Witnesses:

WILLIAM H. TIERNEY,
EDWARD TIERNEY.