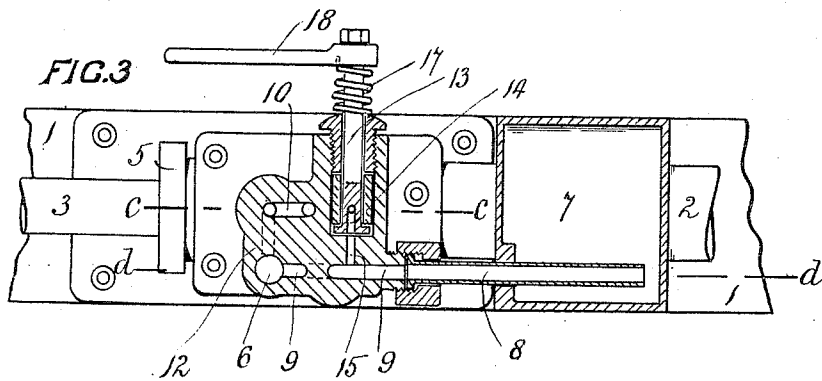
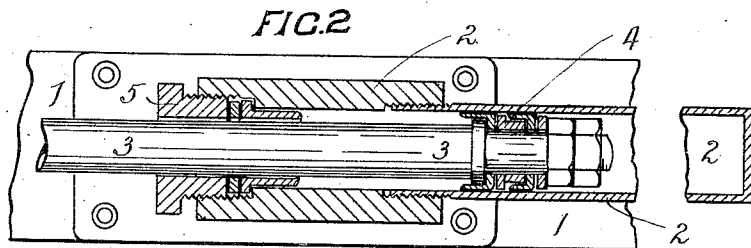
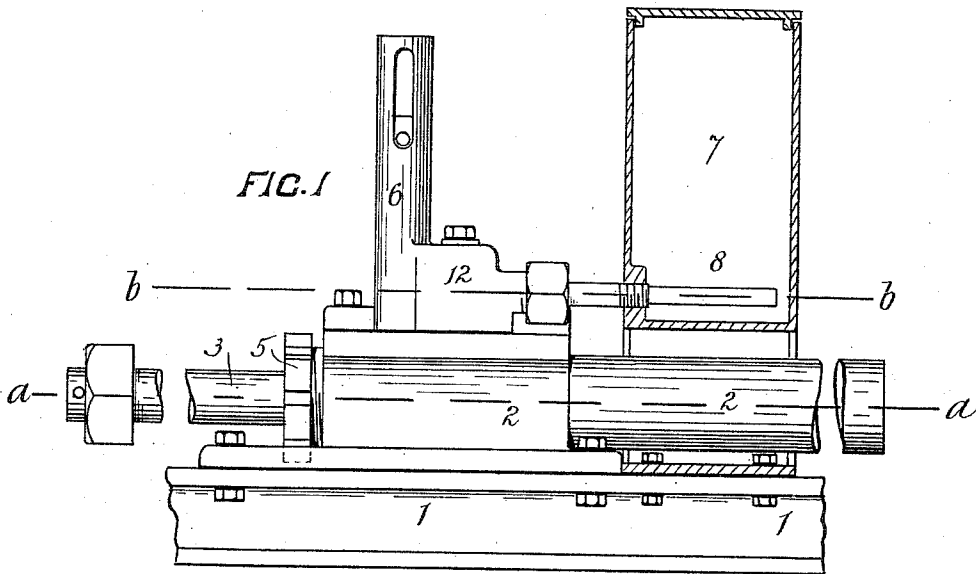


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DEEP WELL BORING APPARATUS.
APPLICATION FILED DEC. 15, 1911.

1,049,481.

Patented Jan. 7, 1913.

2 SHEETS—SHEET 1.



WITNESSES:

John C. Sanders
Albert F. Heuman

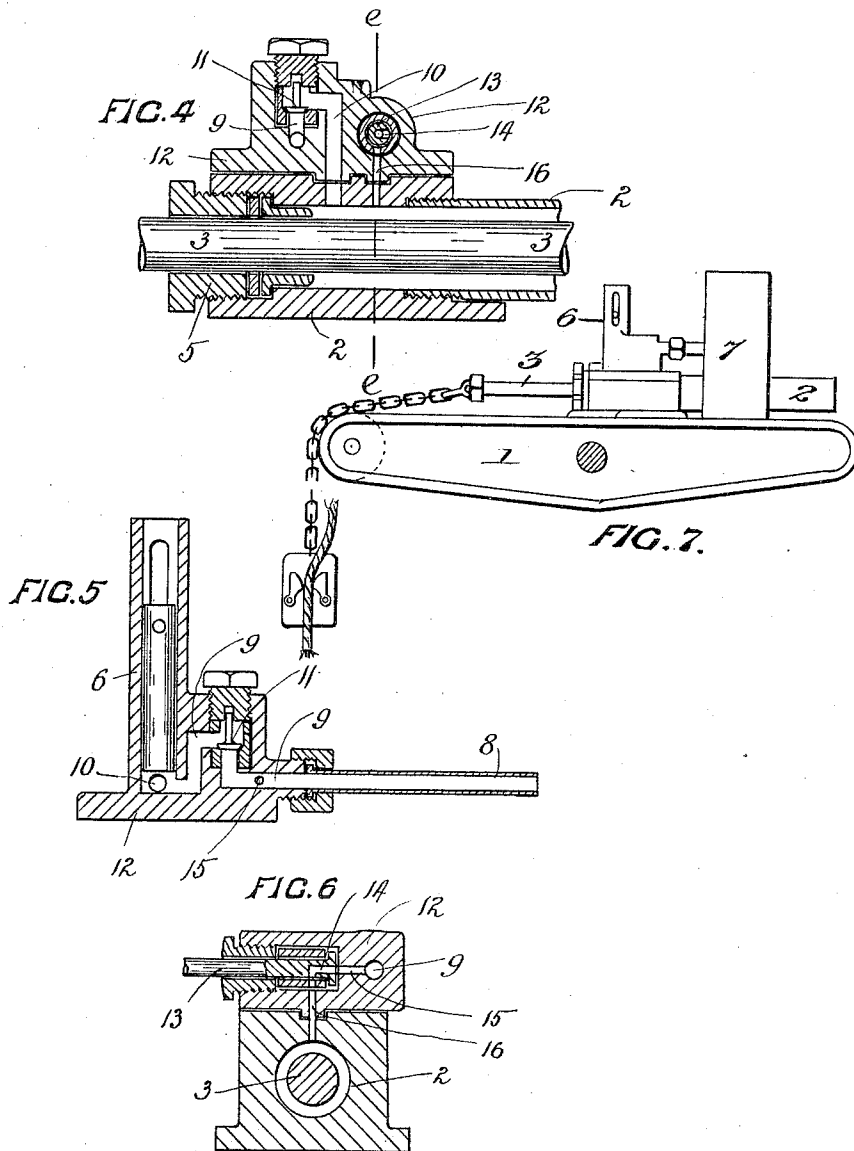
INVENTORS:

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ATTY.

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UNITED STATES PATENT OFFICE.

JOHN HENRY HERMAN AND BERNARD JACOB WEGER, OF NAPIER, NEW ZEALAND.

DEEP-WELL-BORING APPARATUS.

1,049,481.

Specification of Letters Patent.

Patented Jan. 7, 1913.

Application filed December 15, 1911. Serial No. 665,971.

To all whom it may concern:

Be it known that we, JOHN HENRY HERMAN and BERNARD JACOB WEGER, citizens of the United States of America, residing at Napier, New Zealand, have invented new and useful Improvements in Deep-Well-Boring Apparatus; and we do hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to the apparatus used in deep well boring operation and particularly to the means employed in the "cable" system of drilling in which a tool is suspended from a cable and caused to be alternately raised and dropped within the bore.

The invention has been designed in order to provide improved means whereby the tool suspended upon the cable may be lowered from time to time as is required in the boring operations as the tool breaks away the rock or other matter through which the bore is being made.

The invention consists in the combination with the ordinary walking or rocking beam used for alternately raising and dropping the boring tool by the attachment thereto of the suspension cable, of a fluid controlled plunger rod mounted in a cylinder and to the outer end of which the cable is attached. This rod is adapted to be forced back into the cylinder by pumping a suitable fluid into the cylinder and then to be allowed to move outward to any required extent, and from time to time, by the opening of a relief valve, and thereby to lower the tool through corresponding distances.

In carrying out the invention, the pump for forcing the fluid into the cylinder and the relief valve are preferably combined in special forms with the cylinder itself and with the reservoir for holding the fluid and mounted on the walking beam so that the whole of the appliances shall be self contained.

In the accompanying drawings which illustrate this special arrangement and combination of the appliances:—Figure 1 is a side elevation, Fig. 2 a sectional plan on the line *a—*a** of Fig. 1. Fig. 3 a similar section on the line *b—*b** of Fig. 1. Fig. 4 is a sectional elevation on the line *c—*c** of Fig. 3. Fig. 5 a sectional elevation on the line *d—*d** of Fig. 3. Fig. 6 a cross sectional elevation on the line *e—*e** of Fig. 4. Fig. 7

is a diagram illustrating the arrangement of the parts upon the working beam.

1 represents the ordinary walking beam of the boring apparatus mounted and rocked in the usual manner.

2 is a cylinder mounted longitudinally along the top of the beam 1 and within which is fitted the inner end of the plunger rod 3. This rod is provided with the plunger 4 closely fitting the cylinder and passes out through a suitable gland packing 5 on the front end thereof. The outer end of the rod 3 is continued for any desired length and is provided with any suitable means by which the drill cable may be fastened thereto. The movements in and out of the plunger rod within the cylinder will thus draw up or lower the cable.

In use, the plunger rod is moved in under the action of a fluid pumped into the cylinder under pressure sufficient to sustain the weight of the cable and drill, and the cable is then attached to the outer end of the rod. The cylinder and plunger rod rock with the beam 1 in its working so that the drill is raised and dropped in the usual manner. By partially relieving the pressure in the cylinder from time to time and as required, the plunger rod will be drawn outward and thereby lower the drill relatively with the beam. The means shown in the drawings for thus operating and controlling the plunger rod, consist of a pump 6 adapted to draw a fluid from the reservoir 7 mounted on the beam 1, through a pipe 8 and passage 9 formed in a casting 12 in which the pump cylinder is formed, and to force it through a passage 10 into the cylinder near its front end. The passages 9 and 10 are provided with non-return valves 11 to prevent any back flow of the fluid from the cylinder to the reservoir. These passages and valves are clearly illustrated in Figs. 3, 4 and 5. The casting 12 is fitted on to the top of the cylinder 2 and secured thereto by suitable means.

Fitted transversely in the casting 12 is a plug valve 13 mounted to rotate therein. This valve is made with a port passage 14 (Figs. 3, 4, and 6) extending from its inner end and opening through its side. At its inner end this port makes permanent connection with a passage 15 (Figs. 3 and 6) formed in the casting 12 and entering the fluid passage 9 therein. The outer end of

the port is adapted to make connection with a passage 16 (Figs. 4 and 6) leading from the cylinder 2 when the plug is turned around to the position shown in Fig. 6. When therefore the plug is turned to this position an open connection is made between the cylinder and the reservoir through the passage 16, the port 14 in the plug, the passage 15 and the passage 9 and pipe 8. The fluid in the cylinder may then escape back into the reservoir. When the plug is turned to the position shown in Fig. 4 a solid portion of the plug will close the passage 16 and thereby prevent any escape of the fluid from the cylinder 2. The plug is retained normally in this latter position by means of the spring 17 (Fig. 3) surrounding its outer end, and it is provided with a handle 18 by means of which it may be turned against the action of such spring. In use therefore, the plunger rod 3 is forced back by pumping fluid from the reservoir 7 into the cylinder, and it is allowed to move outward again by turning the plug valve 13 and holding it open for any desired length of time according to the distance the drill is to be lowered. The fluid released from the cylinder will then flow back into the reservoir so that it may be used over again. The fluid preferably employed for the working of the invention is any suitable oil.

What we do claim as our invention, and desire to secure by Letters Patent is:—

1. In deep well boring apparatus, the combination with a walking beam, of a cylinder mounted longitudinally along such a beam, a plunger mounted in such cylinder a plunger

rod attached to the plunger, extending out through one end of the cylinder and connected at its outer end to the drill cable, a fluid reservoir upon the walking beam, a pump cylinder upon the beam, a connection leading from the reservoir into such pump cylinder and a connection leading from the pump cylinder into the main cylinder, a non-return valve governing each of such connections, a plunger mounted in the pump cylinder, a passage leading from the main cylinder into the reservoir, a valve controlling such passage and a spring normally retaining such valve in the closed position, substantially as specified.

2. In deep well boring apparatus, the combination with the walking beam and with the drill suspension cable, of a cylinder mounted longitudinally along the beam, a plunger rod fitted at one end into the cylinder and at the other end attached to the suspension cable, a fluid reservoir upon the beam, a pump connecting the reservoir with the cylinder, a passage leading from the cylinder to the reservoir, a valve controlling such passage and a spring retaining such valve normally in the closed position, substantially as herein specified.

In testimony whereof, we have signed this specification in the presence of two subscribing witnesses.

JOHN HENRY HERMAN.
BERNARD JACOB WEGER.

Witnesses:

W. ALEXANDER,
M. E. BROWN.