Dec. 10, 1957 A. ANDREATTA 2,815,929

WELL DRILLING RIGS

Filed Dec. 22, 1955 2 Sheets-Sheet 1

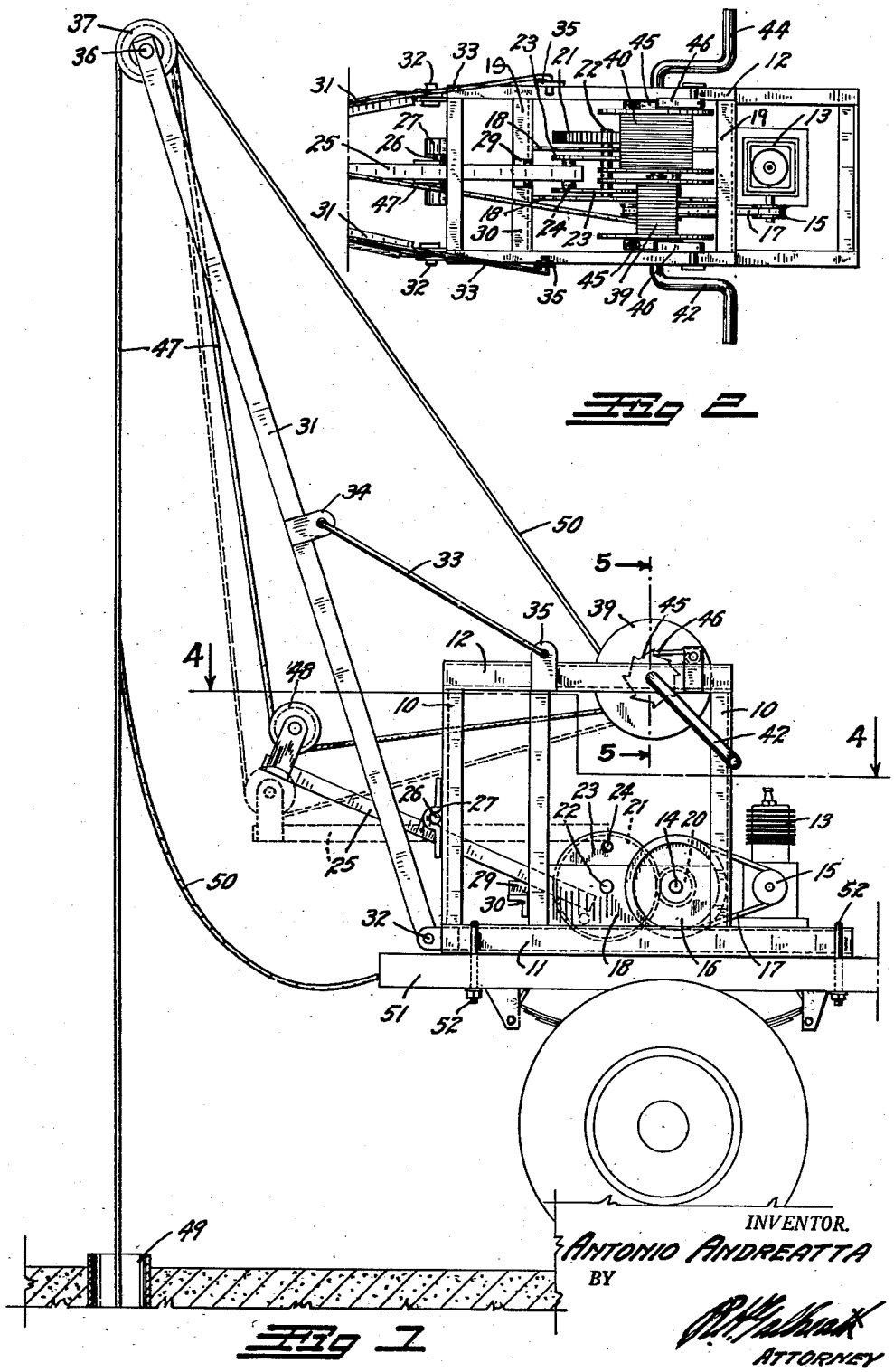


Fig. 1

Fig. 2

INVENTOR.
ANTONIO ANDREATTA
BY
ATTORNEY

Dec. 10, 1957 A. ANDREATTA 2,815,929

WELL DRILLING RIGS

Filed Dec. 22, 1955 2 Sheets-Sheet 2

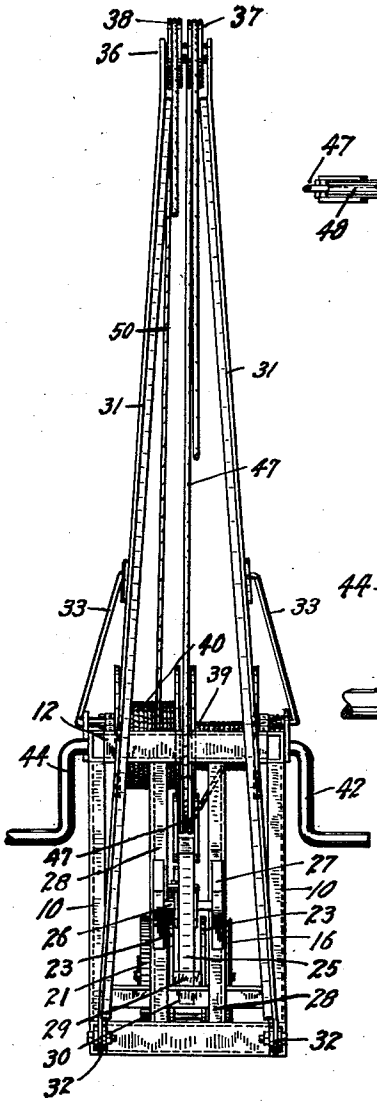


Fig 3

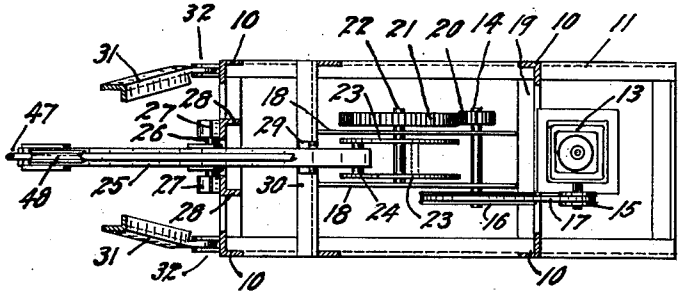


Fig 4

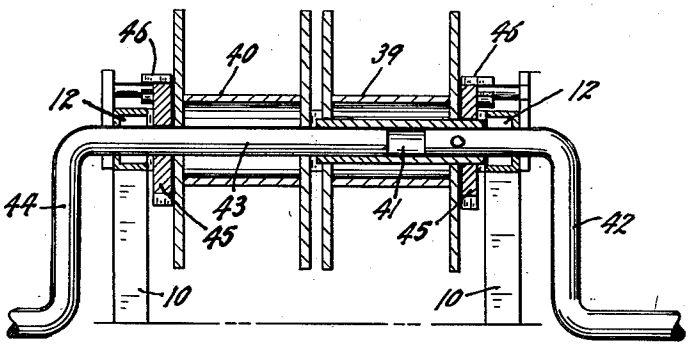


Fig 5

INVENTOR.
ANTONIO ANDREATTA
BY
ATTORNEY

United States Patent Office

2,815,929

Patented Dec. 10, 1957

2,815,929

WELL DRILLING RIGS

Antonio Andreatta, Walsenburg, Colo.

Application December 22, 1955, Serial No. 554,748

4 Claims. (Cl. 255—13)

This invention relates to a well drilling rig, and more particularly to a relatively small, lightweight, portable rig which can be easily transported in the bed of a pickup truck or other vehicle and easily transported from job to job. The rig has been found exceedingly valuable for drilling prospect holes in rock formations to determine the possibilities of mineral values, such as uranium.

The principal object of the invention is to provide a highly efficient, lightweight, portable device which will impart drilling reciprocation to standard well drilling tools for rapidly drilling vertical drill holes in rock formations.

Another object of the invention is to provide a highly efficient mechanism for lifting and dropping a standard well drilling bit.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention, reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 is a side view of the improved well drilling rig as it would appear in use;

Fig. 2 is a fragmentary top view thereof;

Fig. 3 is a front view thereof;

Fig. 4 is a horizontal section, taken on the line 4—4, Fig. 1; and

Fig. 5 is an enlarged detail section, taken on the line 5—5, Fig. 1.

The improved drilling rig comprises a rigid, open, box-like frame consisting of vertical frame members 10, preferably formed from angle iron, arising from a rectangular base frame 11, preferably formed from channel iron. The vertical frame members support a rectangular top frame 12, also preferably formed from channel iron. The open-box-like frame may be rested on the ground or mounted on the chassis of the truck or other vehicle, such as indicated at 51 in Fig. 1, the suitable U-bolts 52 being provided for anchor purposes.

The base frame 11 supports an internal combustion engine 13, preferably of the small, air cooled type such as used on lawn mowers and other relatively small power-driven devices. The engine 13 drives a countershaft 14 through the medium of a drive pulley 15, a driven pulley 16, and an endless V-belt 17. The countershaft 14 is supported in and extends between two vertical, spaced-apart bearing plates 18 mounted on cross frame members 19 and 30 in the base frame 11. A drive pinion 20 is mounted on the countershaft 14 and meshes with a drive gear 21 mounted on a main shaft 22. The main shaft 22 is also journalled in and extends between the bearing plates 18. A pair of palellel, spaced-apart crank discs 23 are fixedly mounted on the main shaft 22 intermediate the bearing plates 18 and a crank pin 24 extends between the discs 23 in eccentric relation to the axis of the main shaft 22.

A rocker arm 25 is tiltably mounted upon a rocker arm shaft 26 which is supported between suitable bearing straps 27 mounted on two vertical struts 28 extending between the frames 11 and 12. The rocker arm shaft 26 is positioned at a higher elevation than the main shaft 22, and the rear extremitity of the rocker arm 25 extends a short distance between the two crank discs 23 so as to be alternately engaged and disengaged by crank pin 24 during the course of its rotary movement. The forward extremity of the rocker arm is normally supported upon a cushion block 29 of rubber or other cushioning material carried on a cross frame member 30.

A boom consisting of an A-frame 31 arises from suitable hinge structures 32 at the forward extremity of the base frame 11. The A-frame inclines forwardly from the main frame and is supported therefrom by means of hooked rods 33 which are hooked into attachment ears 34 on the A-frame 31 and similar attachment ears 35 arise from the top frame 12. A pulley shaft 36 is mounted in the top of the A-frame 31 upon which a drilling pulley 37 and a bailer pulley 38 are mounted.

A drilling cable reel 39 and a bailer cable reel 40 are mounted in the top frame 12. The drilling reel 39 is fixed upon a tubular shaft 41 terminating in a hand crank 42 and the bailer cable reel 40 is fixedly mounted on an axle shaft 43 rotatably fitted into the tubular shaft 41 and terminating in a bailing crank 44. Each of the reels 39 and 40 is provided with a ratchet wheel 45 and with a suitable ratchet dog 46 to prevent reverse rotation of the reels when desired.

A bailing cable 50 is wound about the cable reel 40 and extends upwardly over the bailer pulley 38 thence downwardly to any suitable bailing tool for recovering debris from the well. When not in use the bailer cable is tied off as indicated in Fig. 1.

A drilling cable 47 is wound upon the drilling cable reel 39 and extends forwardly therefrom beneath a sheave 48 mounted on the forward extremity of the rocker arm 25 thence upwardly over the drilling pulley 37 and downwardly to a standard drilling bit positioned in the well being drilled or the casing thereof such as indicated at 49 in Fig. 1. The drilling bit may be a relatively small replica of any of the conventional varieties used on standard drilling rigs, such as a chisel point drill or a star drill or a core drill, as desired.

In operation, the drilling cable reel 39 is rotated so as to support the drill bit with its drilling extremity in contact with the rock bottom of the well when the rocker arm 25 is in the solid line position of Fig. 1. The engine 13 is then started so as to rotate the crank discs 23 in a clockwise direction in Fig. 1. This will cause the crank pin 24 to travel about a circular arc so that it will rise in contact with the bottom of the rear extremity of the rocker arm 25 to force the latter upwardly, as shown in broken line in Fig. 1. This upward movement of the rear extremity of the rocker arm causes a corresponding downward movement of the forward extremity thereof so that the sheave 48 will pull downwardly against the drilling cable 47 to lift the drill bit from the rock bottom.

When the crank pin 24 passes from beneath the rocker arm 25, the rear extremity of the latter will drop to its former position, urged by the weight of the drill bit and the drilling cable, so as to return to the solid line position of Fig. 1 until again engaged by the crank pin 24. The shock of the dropping extremity is absorbed in part by the cushion block 29. This allows the drill bit to freely and successively drop under the influence of gravity against the rock bottom to exert a drilling action thereon.

As the well or hole increases in depth, the drilling

cable **47** is gradually unreeled from the reel **39** by releasing the ratchet dog **46** the desired number of teeth so that the desired drilling impact on the rock continues throughout the depth of the hole.

When the drilling becomes impeded by rock chips, rock dust, and other debris, the drill bit is withdrawn by rotation of the crank **42** annd a conventional bailer is lowered into the well by rotation of the crank **44** so as to bail the debris from the well suspended in the well water in accord with standard drilling practise.

While the reel **39** has been described as the drilling cable reel and the reel **40** as the bailing reel, it is conceivable that either reel could be used for either purpose. It is also conceivable that only a single pulley could be placed at the top of the A-frame **31** in place of the two pulleys **37** and **38** in which case the drilling cable would be removed from the single pulley and replaced by the bailing cable when desired.

It is desired to call particular attention to the small size and light weight of the entire rig. In actual practise, the box-like frame is 30" x 30" x 18" in size, the A-frame **31** is 108" high and the rocker arm **25** is 36" long. The entire rig fully equipped weighs approximately 200 lbs. It is therefore ideally portable for prospecting purposes.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. A light portable well drilling rig for alternately actuating a cable carrying a drill bit and another cable adapted to carry a bailing device, said rig comprising: a light open boxlike metal framework in which is mounted a light weight internal combustion engine; speed reducing gearing driven by said engine; a crank operated by said gearing; a lever fulcrumed between the ends thereof on bearing members forwardly spaced from said crank, the rear end of said lever extending rearwardly for a sufficient distance in a position so as to be alternately raised and released by the crank during the course of its rotary movement, the forward end of said lever carrying a sheave and the rear end thereof in position to be engaged and released by said crank; a boom attached to and rising from the forward portion of the framework, said boom being provided with two pulleys at the top thereof; a pair of telescoping shafts rotatably mounted on said framework for independent rotation thereon; a separate crank for actuating each shaft; separate reels respectively fixed on said shafts, one of said reels having a cable trained thereabout, the free stretch of which extends under said sheave and over one of said pulleys and down to the extremity thereof carrying the drill bit; the other of said reel having a separate cable trained thereabout, the free portion of which extends over said second pulley and down to the end thereof adapted to carry a bailing device.

2. A light portable well drilling rig as defined in claim 1, in which each of said reels is provided with a separate pawl and ratchet for holding the reel connected thereto in position adjusted by its respective crank.

3. A light portable well drilling rig as defined in claim 1 wherein said boom comprises an open A frame the spaced feet of which are pivotally connected to a forward portion of said framework and the legs of which are guyed intermediately of the lengths thereof to another portion of said framework; said two pulleys being rotatably coaxially mounted at the top converging extremity of said A frame.

4. A light portable well drilling rig, comprising: an open boxlike metal framework including a horizontal bottom frame, a vertical front frame and a horizontal top frame; driving mechanism mounted on said bottom frame including a light-weight internal combustion engine, a countershaft driven thereby and a pair of spaced apart crank discs driven by said countershaft, said crank discs carrying a crank pin between them; a rocker arm pivotally mounted between the ends thereof on said front frame, the forward end of said rocker arm carrying a sheave and the rear end of said arm disposed between said discs and extending for a sufficient distance between said discs so as to be alternately raised and released by said crank pin during the course of its rotary movement; a boom comprising an A shaped forwardly inclined frame member having the spaced feet thereof hinged to said bottom frame and the converging top thereof provided with a pulley, intermediate points on the sides of said A frame member being provided with supporting guy rods connected to said top frame; reel means on said top frame having a cable trained thereover and connected at one end to a drill bit, said cable being trained under said sheave and over said pulley; pawl and ratchet means for adjusting the rotary position of said reel for paying out said cable; and means on said bottom frame for firmly anchoring the rig on a stable support, whereby vigorous drilling operation produced by the light weight driving mechanism will not disturb the firm position of the rig.

References Cited in the file of this patent

UNITED STATES PATENTS

236,492	Harmon	Jan. 11, 1881
972,563	Morgan et al.	Oct. 11, 1910
977,409	Kirk	Nov. 29, 1910
1,269,343	Wacker	June 11, 1918

FOREIGN PATENTS

50,829	Austria	Nov. 25, 1911
109,505	Australia	Jan. 8, 1940
1,080,955	France	June 2, 1954