No. 795,534. PATENTED JULY 25, 1905.

M. McCAIN.

DEEP WELL DRILLING MACHINE.

APPLICATION FILED FEB. 16, 1905.

5 SHEETS—SHEET 1.

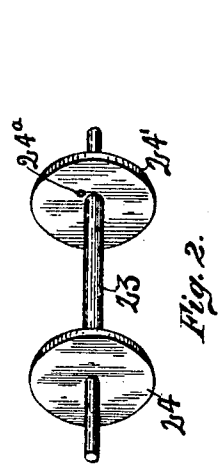


Fig. 2.

Fig. 1.

WITNESSES,
J. C. Duvall
R. F. Randle,

INVENTOR,
MERT McCAIN,
by his attorney,
Robert W. Randle.

ANDREW B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

No. 795,534. PATENTED JULY 25, 1905

M. McCAIN.

DEEP WELL DRILLING MACHINE.

APPLICATION FILED FEB. 16, 1905.

5 SHEETS—SHEET 2.

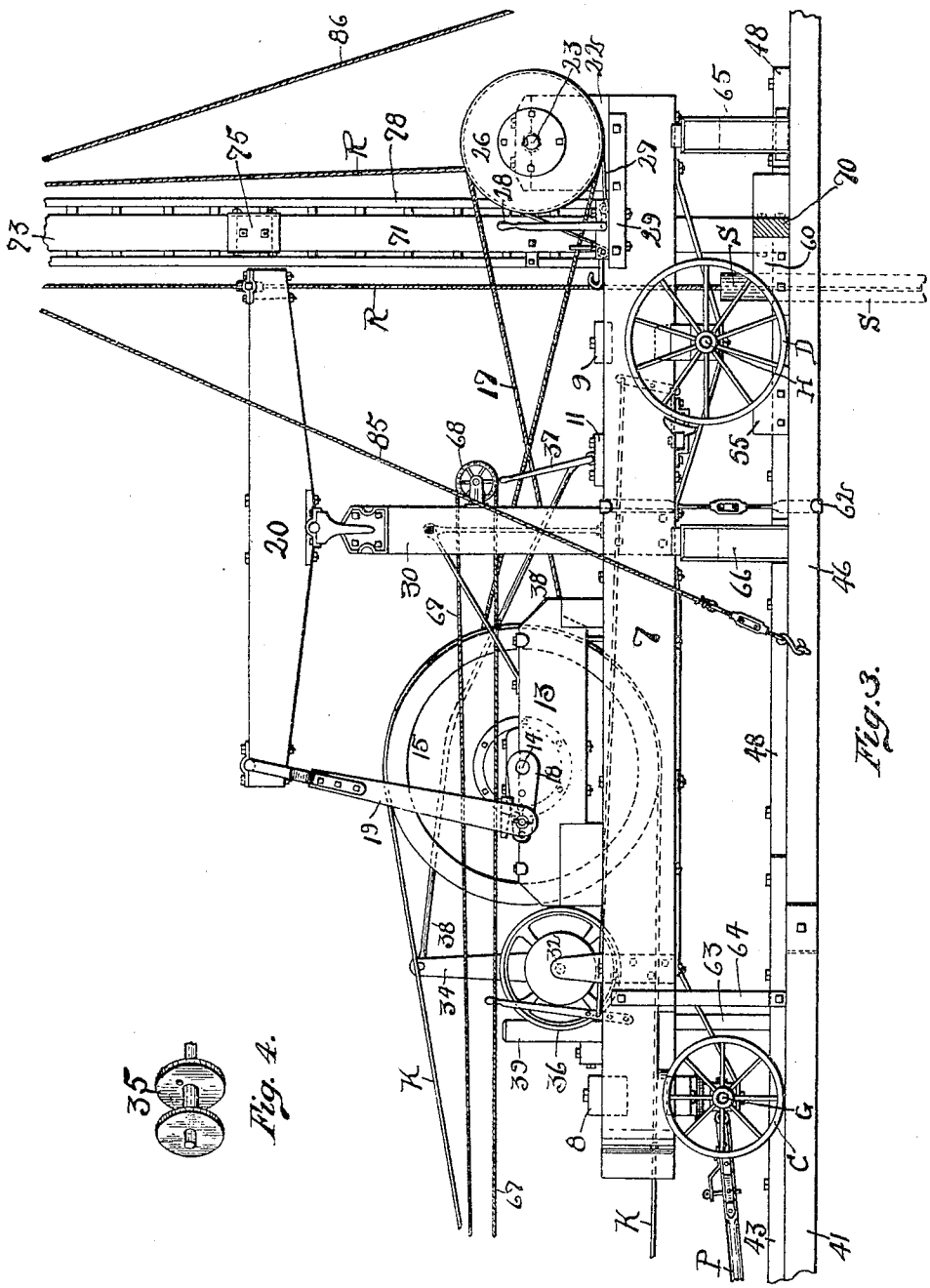


Fig. 3.

Fig. 4.

WITNESSES,

S. E. Duvall.

K. E. Randle.

INVENTOR,

MERT McCAIN;

by his attorney,

Robert W. Randle

ANDREW B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

No. 795,534. PATENTED JULY 25, 1905.

M. McCAIN.

DEEP WELL DRILLING MACHINE.

APPLICATION FILED FEB. 16, 1905.

5 SHEETS—SHEET 3.

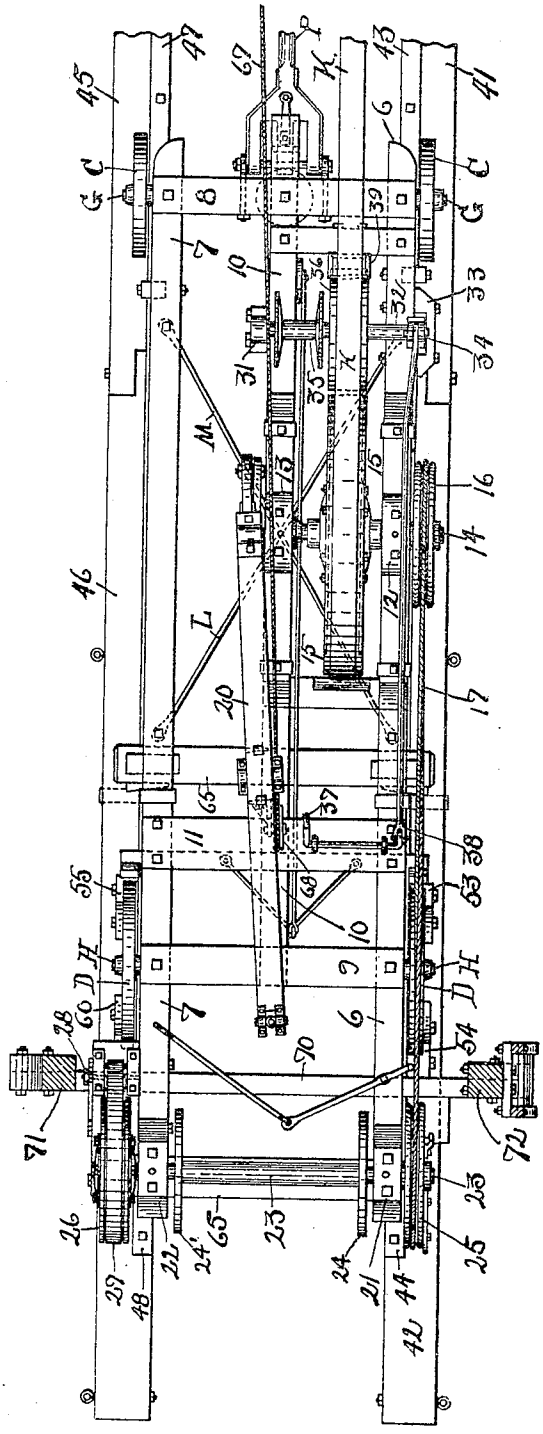


Fig. 3.

WITNESSES,
S. C. Duvall.
R. E. Randle.

INVENTOR,
MERT McCAIN,
by his attorney,
Robert A. Randle

ANDREW B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

No. 795,534. PATENTED JULY 25, 1905.

M. McCAIN.

DEEP WELL DRILLING MACHINE.

APPLICATION FILED FEB. 16, 1905.

5 SHEETS—SHEET 4.

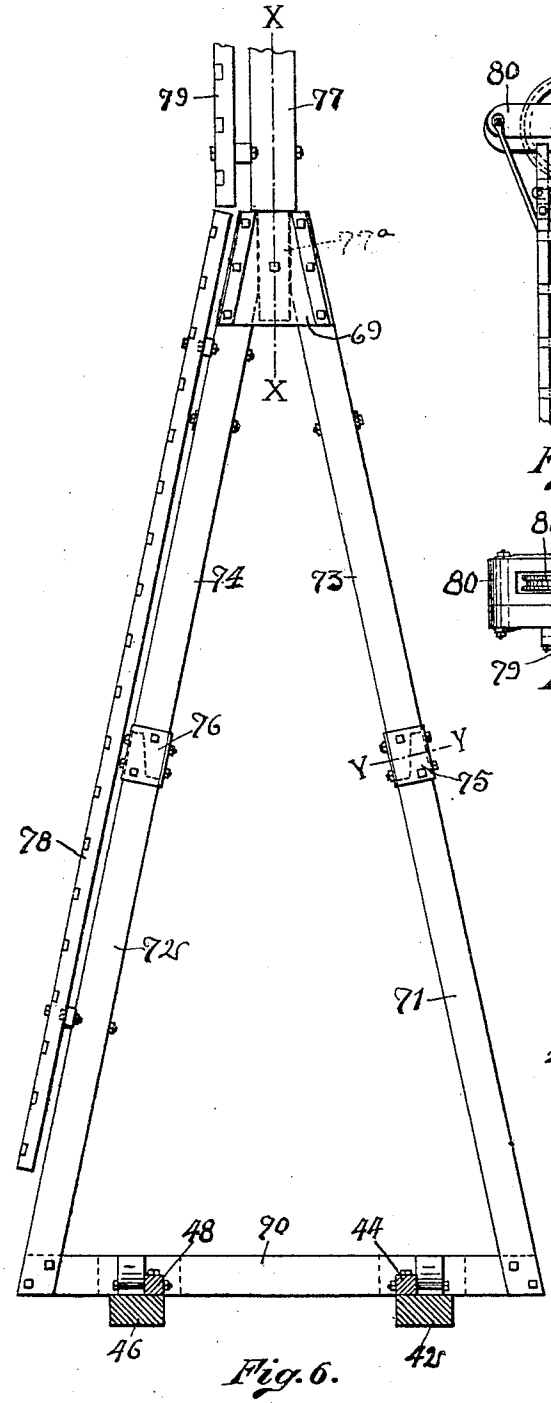


Fig. 6.

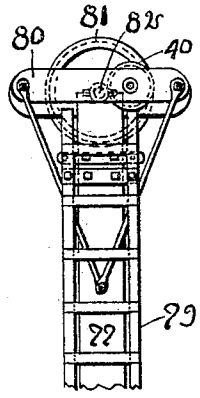


Fig. 8.

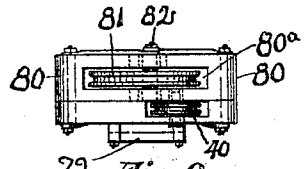


Fig. 9.

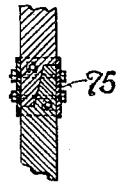


Fig. 10.



Fig. 11.

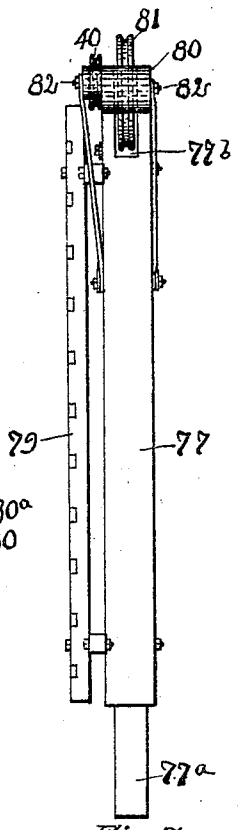


Fig. 7.

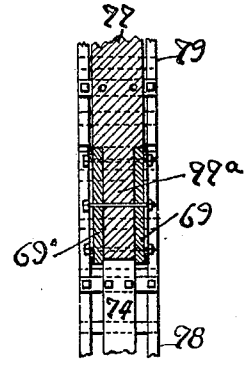


Fig. 12.

WITNESSES,
S. C. Duvall.
R. B. Randle.

INVENTOR,
MERT McCAIN,
by his attorney,
Robert B. Randle.

ANDREW B. GRAHAM CO. PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

No. 795,534. PATENTED JULY 25, 1905.

M. McCAIN.

DEEP WELL DRILLING MACHINE.

APPLICATION FILED FEB. 16, 1905.

5 SHEETS—SHEET 5.

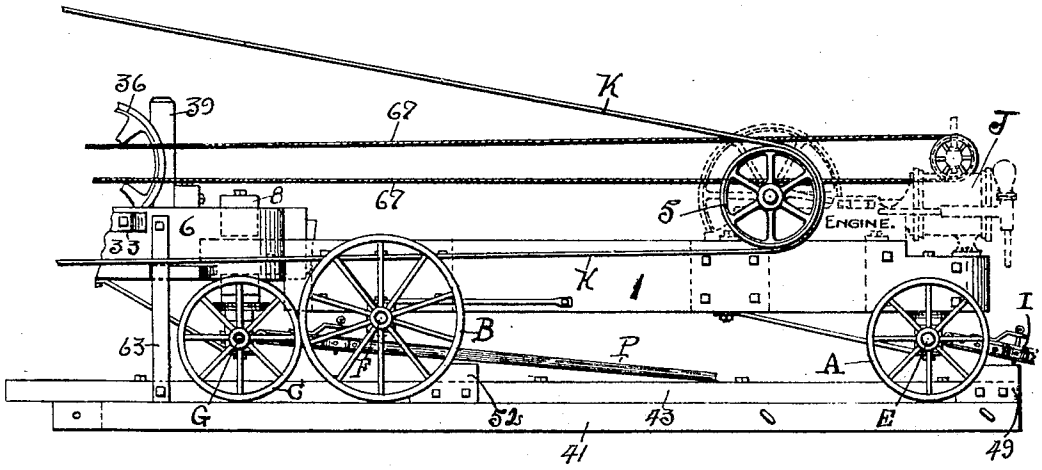


Fig. 13.

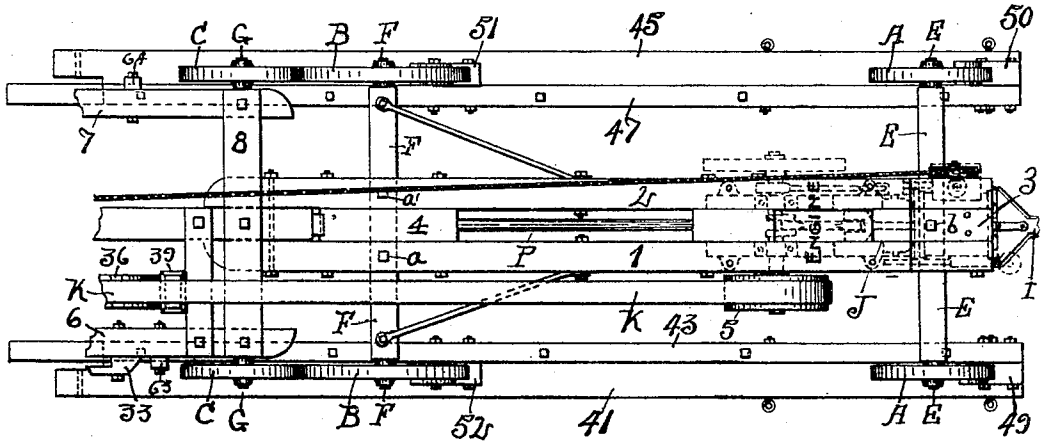


Fig. 14.

WITNESSES,
S. E. Duvall.
R. E. Randle.

INVENTOR,
MERT McCAIN,
by his attorney,
Robert W. Randle.

ANDREW B. GRAHAM CO. PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

MERT McCAIN, OF PORTLAND, INDIANA.

DEEP-WELL-DRILLING MACHINE.

No. 795,534. Specification of Letters Patent. Patented July 25, 1905.

Application filed February 16, 1905. Serial No. 245,912.

To all whom it may concern:

Be it known that I, MERT McCAIN, a citizen of the United States, residing in the city of Portland, in the county of Jay and State of Indiana, have invented certain new and useful Improvements in Deep-Well-Drilling Machines, of which the following is a specification, which when taken in connection with the accompanying drawings, forming a part thereof, is sufficiently clear and concise as to enable others skilled in the art to which the invention relates to make and use the same.

My present invention contemplates a radical reconstruction of the constituent elements of machines of this general character, combined with new devices and operations, the addition of new elements and mechanical movements, and as a natural sequence accentuating the utilitarian benefits and adapting them to subserve the highest economic ends.

In this invention my object, broadly speaking, is the provision of an improved deep-well-drilling machine having new and improved means for the better accomplishment of the results required therefrom and to reduce the cost of production of wells of the character stated.

A more specific object is to produce a well-drilling machine which may be easily removed and set up in a new site easily and quickly without the necessity for dismembering the parts and to provide for easy expeditious means for transporting the outfit or rig from point to point.

Other objects and particular advantage of the invention will be made manifest and will appear in the course of the following specification.

For a more thorough understanding of the invention reference is now had to the accompanying drawings, in which—

Figure 1 is an elevation of the rear portion of the right-hand side of my machine. Fig. 2 is a detail view of the cable-reel, isometrically taken. Fig. 3 is an elevation of the rear portion of the left-hand side of my machine. Fig. 4 is a detail of the sand-reel, isometrically taken. Fig. 5 is a top plan view of the rear portion of my machine. Fig. 6 shows an elevation in detail of the lower section of the mast. Fig. 7 is a detail edge view of the upper section of the mast. Fig. 8 is a detail side elevation of the top portion of the upper section of the mast. Fig. 9 is a plan view of the top of the mast. Fig. 10 is a detail sectional view of one of the mast-joints, taken on the line Z Z of Fig. 11. Fig. 11 is a cross-sectional view of one of the mast-joints, taken on the line Y Y of Fig. 6. Fig. 12 is a detail section of a part of the mast, taken on the line X X of Fig. 6. Fig. 13 is a side elevation of the front portion of my machine, and Fig. 14 is a plan view of the front portion of my machine.

Similar indices refer to and denote like parts throughout the several views of the drawings.

In order that my invention may be more fully understood by those unfamiliar with the art, I will now take up a detail description thereof, which I will set forth as briefly and compactly as I may.

My invention is divided, for convenience, into two general divisions or parts—the front and the rear—each part being mounted on two pairs of wheels or trucks, of which the letters A A denote the front wheels of the front or engine-carrying section. B B denote the rear wheels of the same front section.

C C denote the front wheels of the rear section, and D D denote the rear wheels of the rear section.

The wheels A A are mounted on a centrally-pivoted axle E. The wheels B B are mounted on the stationary axle F. The wheels C C are mounted on the centrally-pivoted axle G, and the wheels D D are mounted on the stationary axle H.

The frame of the front section is composed of the sills 1 and 2, which are spaced a short distance apart by the blocks 3 and 4, said sills being secured on top of the axle F by the bolts *a* and *a'* and pivotally mounted on top of the axle E by the king-bolt *b*, substantially as shown. A tongue I is mounted to the front axle E, whereby the section may be moved. Mounted on the forward ends of the sills of the front section is the engine J of any preferred construction, having the pulley-wheel 5, over which operates the belt K. The said front section is provided with all necessary braces and equipment, substantially as indicated in the drawings.

The rear section is provided with the two side sills 6 and 7 and the center-sill 10, together with the cross-sills 8, 9, and 11, also with other intermediary cross-sills as required to support various parts of the machine, substantially as shown, and this section is further made rigid by the crossing braces L and M, secured on the under edges of the sills. Rising from the sills 6 and 10 slightly forward of the center

are the respective pillow-blocks 12 and 13, in which is mounted the shaft 14. A tongue P is attached to the front axles of the rear section, which is accomplished in the usual manner, whereby the section may be moved. Mounted on the shaft 14 between the pillow-blocks 12 and 13 is the power-wheel 15, over which passes the belt K, as shown. Mounted on the outer projection of the shaft 14 is the channel-wheel 16, over which operates the cable-belt 17. Mounted on the inner end of the shaft 14 is the crank 18, and on the wrist-axle of the crank 18 is pivotally mounted the pitman 19, which latter is pivotally mounted over the forward end of the walking-beam 20, the operation of which will presently be made manifest. Secured on the upper edges of the rear ends of the sills 6 and 7 are the journal-bearings 21 and 22, respectively, by which is mounted the reel-shaft 23. Secured on the reel-shaft 23 between the bearings 21 and 22 are the disks 24 and 24′, forming the main cable-reel for the cable R. As shown in Fig. 2, the disk 24′ has an aperture 24^a therethrough, by which the end of the cable R may be secured. On the right-hand end of the shaft 23 is secured the channel-wheel 25, corresponding to the wheel 16. Between the wheel 16 and the wheel 25 is the cable-belt 17, above referred to, which is crossed upon itself, as shown, in order to obtain the proper direction of rotation for the wheel 25 and the parts thereunto connected. On the left-hand end of the shaft 23 is mounted the friction-wheel 26, over which passes the spring band or brake 27, which may be shortened or lengthened by the operation of the lever 28, whereby the brake is applied to or released from the wheel 26, by which said reel may be held stationary or allowed to revolve at the desired rate of speed. The said lever 28 and the spring-band 27 are mounted on the bracket 29, which is secured to the side of the sill 7. Extending up from the sill 10 in rear of the wheel 15 is the samson-post 30, on the top of which is centrally and pivotally mounted the walking-beam 20. The rear end of the walking-beam 20 is provided with an eye 20^a, formed vertically therethrough to receive the cable R, and with gripping means mounted on said end of said beam for manipulating said cable R in a manner well known to the art.

The letter S denotes a well, or more specifically the upper end of the well-casing, into which the cable R is adapted to enter, as shown, as it is released from the cable-reel.

It will now be seen that the engine being in operation the wheel 15 is revolved, causing the walking-beam to rock, (the cable-belt 17 being temporarily removed,) whereby the tools on the end of the cable will be operated up and down in the well, and the cable being released the tools may be removed from the well, (removing temporarily the pitman from the crank 18 and replacing the cable-belt 17,) thus causing the reel to revolve and wind up the cable R, carrying the tools up through the mouth of the well, where they can be held at any point desired, or they can be again lowered by the operation of the lever 28, as indicated.

Rising from the left side of the sill 10 is a bearing 31 for the shaft 32. On the outer side of the sill 6 is a bearing 33, in which is pivoted the lower end of the arm 34. In the arm 34, slightly below its center, is pivoted the outer end of the shaft 32, whereby as the upper end of the arm 34 is moved forward and backward the outer end of the shaft 32 will be moved horizontally. Mounted on the shaft 32 near its left end is the sand-line reel 35, having means for securing the end of the sand-line thereto, as shown in Fig. 4. Also secured on the shaft 32 in alinement with the power-wheel 15 is the friction-wheel 36, which wheel is adapted to have its periphery contacted with the periphery of the power-wheel 15. Mounted on the cross-sill 11 is the lever 37, which is by the link 38 connected to the arm 35, whereby the control of the sand-line reel will be in reach of the operator, who is usually stationed at a point within reach of the said lever 37.

Secured to the base-frame and rising in front of the wheel 36 is the brake-post 39. By the above it will be seen that the sand-line may be secured on the reel 35 and may be wound thereon by operating the lever 37 to contact the wheel 36 with the power-wheel 15, and then by a reverse movement of the lever 37 the wheel 36 is drawn back against the brake-post 39, thus stopping the winding of the reel and preventing reverse or unwinding of the line, if desired, and whereby means are provided for releasing the said line at the speed desired. The said sand-line is arranged to extend from the pulley 35 over the pulley 40, Figs. 7, 8, and 9, and then down into the well, for the purposes well known.

I now come to one of the most novel features of my present invention, which is that of the track for the said traction-wheels.

The figures 41 and 42 denote the base for the two, front and rear, sections of the right-hand track, respectively, while the figures 43 and 44 denote the respective flanges therefor, which rise from the inner edges, respectively, as shown.

The figures 45 and 46 denote the base for the two, front and rear, sections of the left-hand track, respectively, while the figures 47 and 48 denote the respective flanges therefor rising from the inner edges, as shown.

The two sections of track on each side are constructed to interlap and lock together to form a strong joint, substantially as indicated.

It will now be seen that the track may be laid on the ground or on ties and spaced the desired distance apart to receive the wheels of the front and rear sections of the machine.

The front section of the machine, containing the engine, is then run on the track from the left to the right and the wheels are chocked from further advance by the blocks 49, 50, 51, and 52, and, further, it will be seen that the rear section of the machine may then be run on the track from the left to the right, bringing its front end in contact with the rear end of the front section, as is indicated, after which the rear wheels should be chocked by the blocks 53 and 54 for the right-hand wheel D and 55 and 60 for the left-hand wheel D. All of said blocks for chocking the wheels may be secured to the flanges of the track at predetermined points by means of bolts or the like, as is indicated.

At points between the front and rear wheels of the rear section the machine should be securely clamped down by the employment of the turnbuckle-clamps 61 and 62, and in most instances the employment of the ties 63 and 64 is desirable, which ties are bolted to the sills of the machine toward the forward portion of the rear section and extending down, where they are bolted to the flanges of the rail, substantially as shown.

The rear portion of the rear section of the machine should be provided with the auxiliary supports 65 and 66 in order to relieve the traction-wheels of the greater portion of the weight of that part of the machine, which supports rest upon the track and extend up against the under side of the sills of the frame at about the points indicated.

In order that the operator, who usually stands on the machine at about the location of the cross-sill 9, may have control of the engine from that position, a telegraph-cord 67 is provided, which passes over the engine-valve pulley and then extends forward, as shown, and passes over the operating-wheel 68.

A novel feature of my invention is that of the construction of the mast, which is shown most fully in Figs. 6, 7, 8, 9, 10, 11, and 12, and it is described as follows: The numeral 70 denotes the base of the mast, and secured to the ends of the base 70 and rising convergently therefrom are the lower posts of the lower section, (denoted by the numerals 71 and 72,) and forming an upward continuation of the latter are the upper posts of the lower section, (denoted by the figures 73 and 74.) The posts 71 and 73 and the posts 72 and 74 are adapted to be coupled together by the interlocking and novel joints 75 and 76, respectively, which are of identical construction and are as shown in detail in Figs. 10 and 11. The upper ends of the members 73 and 74 approach near to but not in contact with each other, and they are secured and spaced apart by a pair of plates 69 and 69′, which are secured by bolts or the like and by which a square socket or vertical aperture is formed between said plates and the upper end of the post, as is clearly indicated in Fig. 6. The numeral 77 refers to the vertical post having a lower tenon 77^a for insertion in the cavity above referred to and as shown in Figs. 6 and 12. Extending up the posts 72 and 74 is the ladder 78, and continuing on upward from the top of the latter and secured to the post 77 is the ladder 79, whereby access may be had to the top of the mast. In the upper end of the post 77 is an open channel 77^b, cut across as shown, and secured on top of said post 77 is the head 80, having the slot 80^a formed therethrough, (alining with the channel 77^b,) in which slot and channel is mounted the channel-pulley 81, which is mounted on the axle 82, as shown. Also mounted in said head 80 is the small pulley-wheel 40, above referred to, and the said head is further secured by suitable braces, substantially as shown. The base member 70 of the mast is adapted to rest on and across the track 42 and 46, to which it may be secured at a point near the well S, as shown. The mast thus formed is secured vertically in position by a system of guy-ropes, as 83 and 84, on the right-hand side of the machine and 85 and 86 on the left-hand side of the machine, said guy-ropes being detachably secured at the base of the track, as indicated, and then extending upward to a proper height, where they are detachably connected to the mast, as shown.

From the above description, when taken in connection with the accompanying drawings, it will be seen that I have produced an improved machine of the class stated which embodies the objects and advantages above referred to, and other objects and advantages not alluded to, but which are apparent.

While I have illustrated and described the best means now known to me for carrying out my invention in a practical manner, I desire that it be fully understood that I do not restrict myself to the exact details of the construction shown and described, but hold that any changes or variations therein as would suggest themselves to the ordinary mechanic would clearly fall within the limits and scope of my invention.

Having now fully shown and described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a deep-well-drilling machine, the combination, of the front and rear sections of the machine separately mounted on traction-wheels, means whereby each section may be attached to for propulsion, a guide-track on which both sections may stand tandem, a mast capable of being dismembered mounted to extend above the machine proper, an engine mounted on one of the sections, means for supporting the mast in a vertical position, and drilling and pumping means mounted on the machine, all substantially as shown and described.

2. In a deep-well-drilling machine capable

of being dismembered, the combination, of the front and rear sections of the machine separately mounted on ground-wheels, means whereby each section may be attached to for propulsion, a track on which both sections are mounted tandem, a mast resting on the track, beneath one end of the machine, means for supporting the mast, an engine for supplying power which engine is mounted at the opposite end of the machine from the mast, a drilling and a pumping means located on the machine, all substantially as shown and described.

3. In a deep-well-drilling machine, the combination of a front and a rear section each mounted independent on ground-wheels, a track on which the wheels of both sections may rest at one time, sills constituting the base of the respective sections, means for mounting the various devices on said sills, means for chocking the ground-wheels, and means for clamping the section to the track, all substantially as shown and described.

4. In a well-drilling machine, means for mounting the machine on traction-wheels, a track on which the traction-wheels may rest, means for connecting the movable parts to the track, a two-part mast adapted to rest on the track below the machine and extend up above the machine, means for disassembling the mast and the track whereby they may be loaded for transportation, and means for attaching to the machine whereby it may be moved from place to place, all substantially as shown and described.

5. A well-drilling machine comprising in combination two sections each having a frame forming its base, a set of trucks mounted below and carrying its particular section, means for attaching propelling means for moving each section independent of the other, an engine mounted on the forward end portion of the front section, well-drilling devices operatively mounted on the rear section, a track on which both the front and rear sections are mounted, a mast resting on said track below the rear end of the rear section and then extending up to a height above the other portions of the machine, means for supporting the mast in position, and means for dismembering the track and the mast for transportation, all substantially as shown and described.

6. In a well-drilling machine, supported on traction-wheels, a track on which said wheels may be mounted, means for securing the machine to the track, a mast having upwardly-converging posts, a top post extending up from the converging posts, a head formed on the top of the top post, a cable-pulley and a sand-line pulley both mounted in said head, and means for supporting the mast vertically, all substantially as shown and described.

7. In a portable well-drilling machine, the combination, two independent frames each mounted on a set of wheels, a track common to all of the wheels, means for connecting the frames tandem, means for securing the frames to the track, drilling and operating means mounted on one of said frames, and an engine mounted on the other of said frames, all substantially as shown and described.

8. In a well-drilling machine mounted on a two-part frame, means for carrying part of the frame on traction-wheels, a track on which the members of the frame may be mounted tandem means for supporting the members to the track, and means for transporting the parts independently, all substantially as shown and described.

9. In a well-drilling machine, the combination of two independent frames on which the various parts of the machine are mounted, ground-wheels for carrying each frame independent of the other, a derrick, and a track on which the ground-wheels and the derrick rest, all substantially as shown and described.

10. In a well-drilling machine comprising in combination, two frames mounted each on a set of ground-wheels, a track for all of said wheels whereby the two frames may be mounted tandem, means for securing the frames to the track, an engine mounted on the forward frame, well drilling and operating devices mounted on the rear frame, and a mast mounted on the track adjacent the rear end of the rear frame, and means for supporting the mast vertically, all substantially as shown and described.

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

MERT McCAIN.

Witnesses:
MAUD McCAIN,
R. E. RANDLE.