(No Model.) 2 Sheets—Sheet 1.

W. C. WELLS.

ROCK DRILL AND WELL BORING MACHINE.

No. 296,804. Patented Apr. 15, 1884.

Fig. 8.

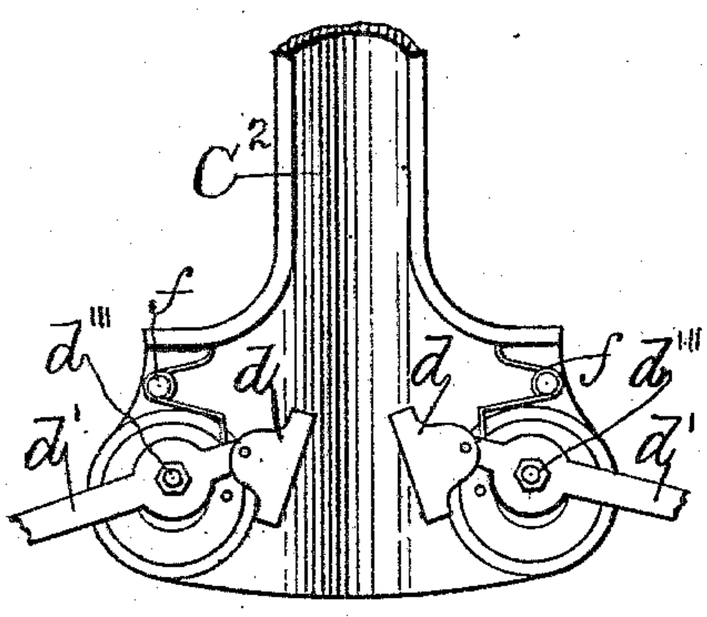


Fig. 1

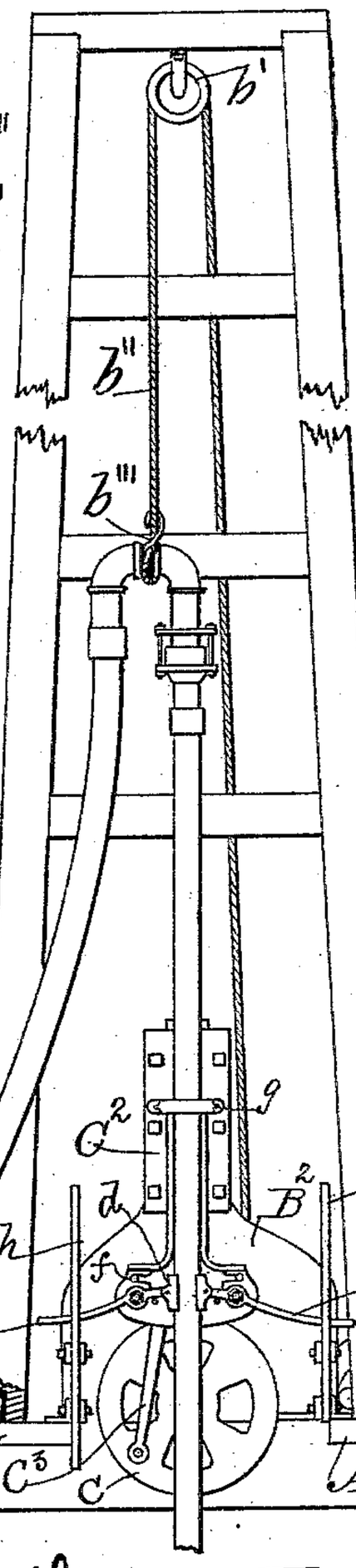
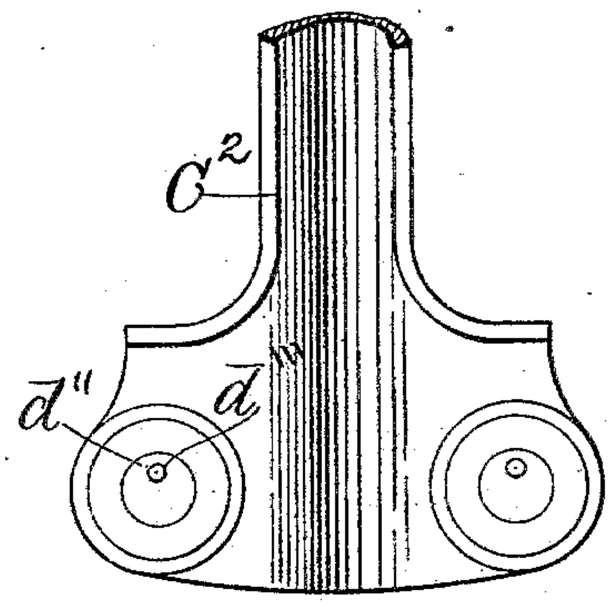


Fig. 7



Witnesses: { Thomas Brooke, Daniel Sloan.

Inventor: Willet C. Wells, By Thomas & Orwig, Attys.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

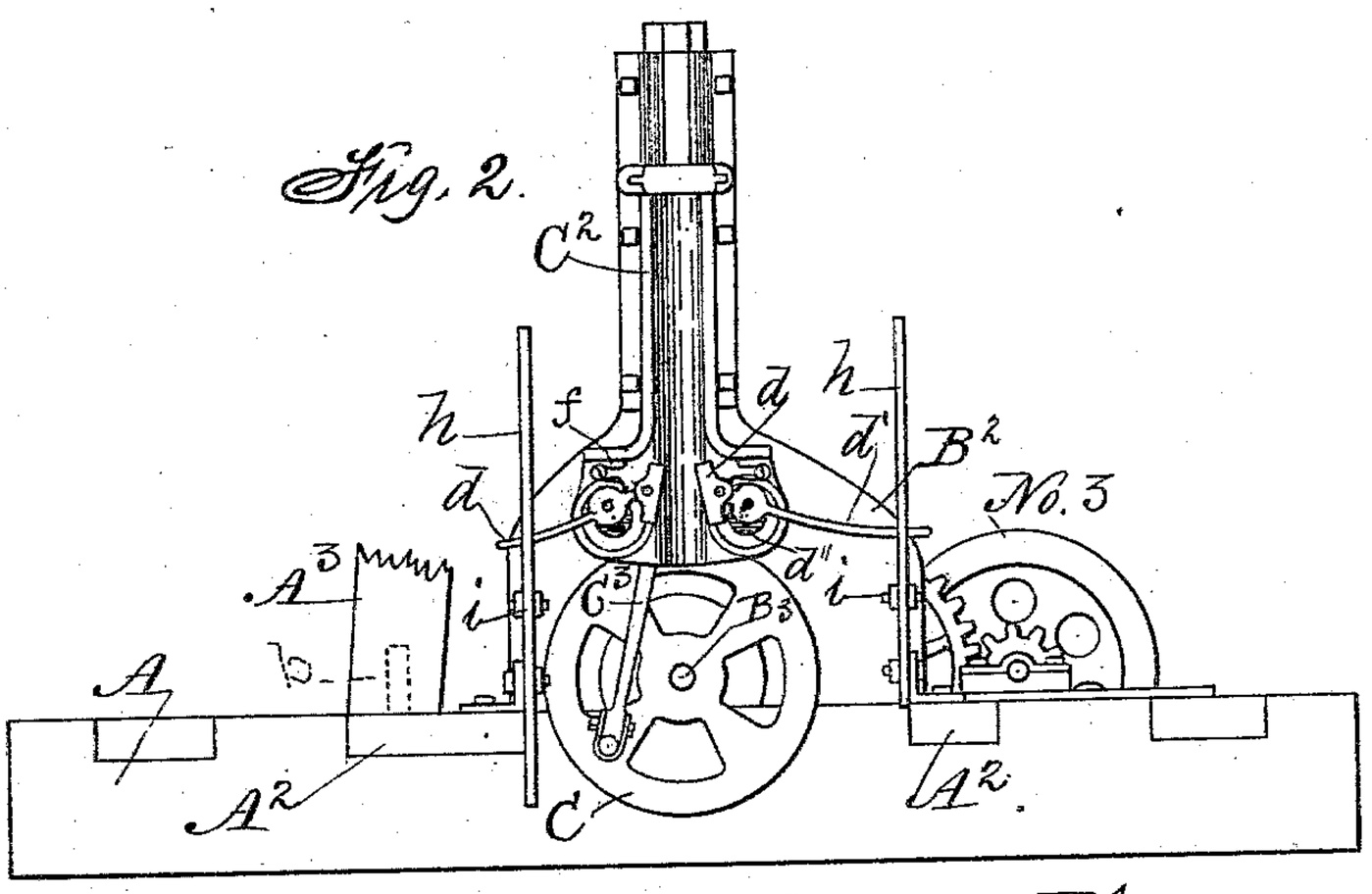

Fig. 3

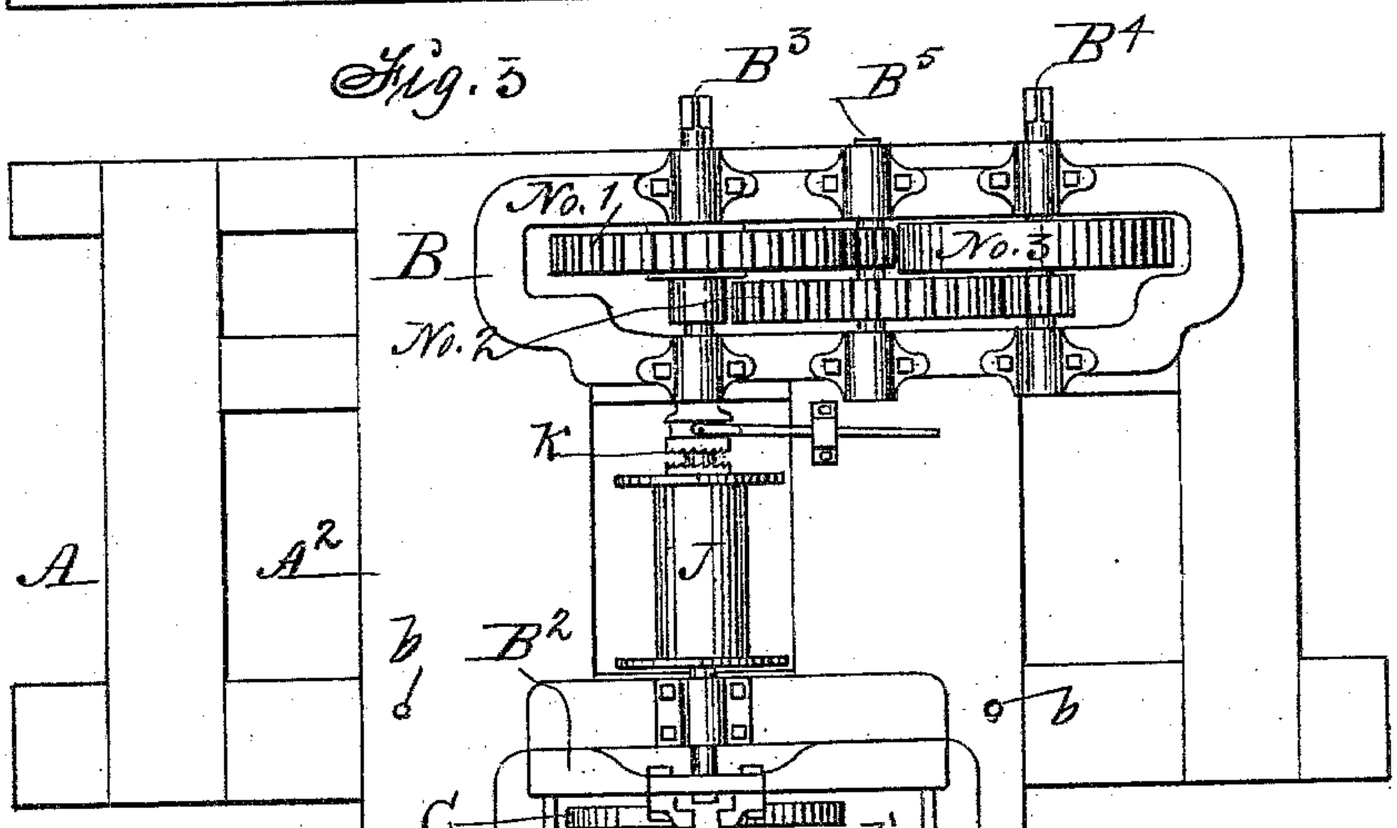

Fig. 4

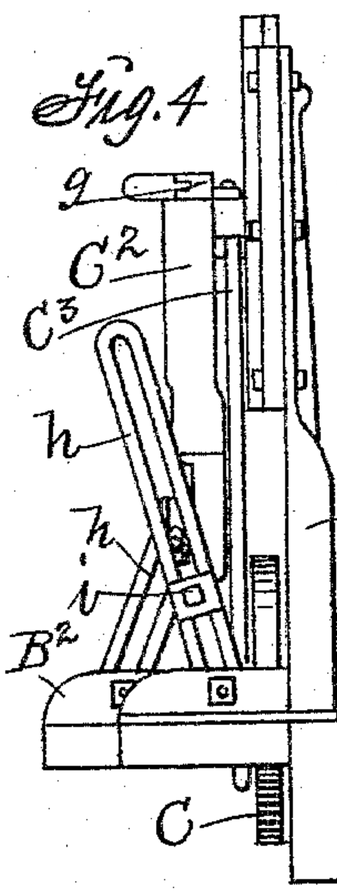

Fig. 5

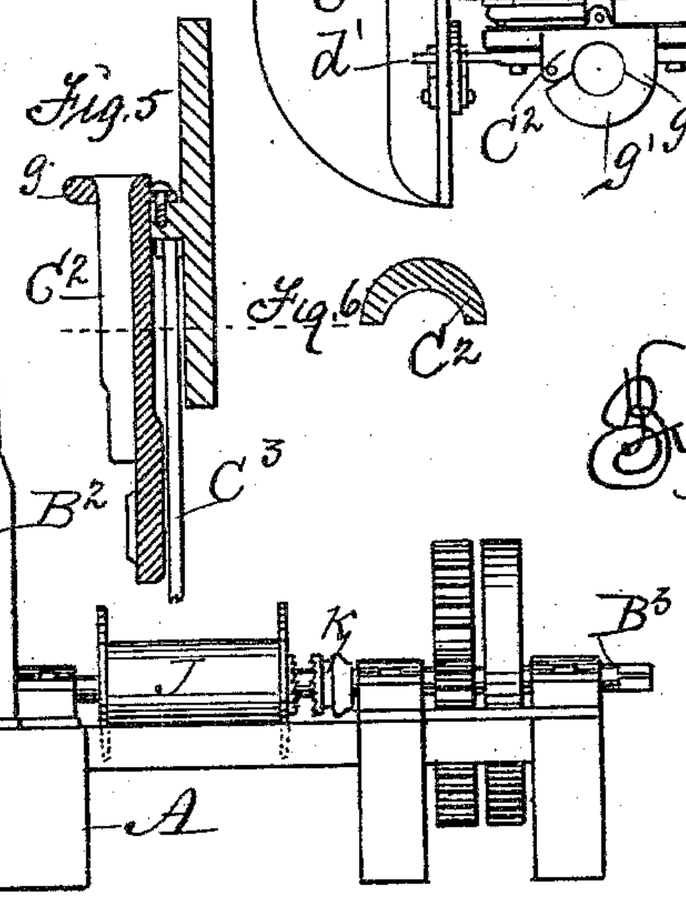

Fig. 6

Inventor:
Willet C. Wells,
By Thomas G. Orwig, Atty

Witnesses:
Thomas Brooke
Daniel Bloom.

UNITED STATES PATENT OFFICE.

WILLET C. WELLS, OF OGDEN, IOWA.

ROCK-DRILL AND WELL-BORING MACHINE.

SPECIFICATION forming part of Letters Patent No. 296,804, dated April 15, 1884.

Application filed January 7, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLET C. WELLS, of Ogden, in the county of Boone and State of Iowa, have invented an Improved Rock-Drilling and Well-Boring Machine, of which the following is a specification.

The object of my invention is to save time and labor in prospecting for coal and other minerals, and in boring Artesian wells.

It consists in constructing a portable machine, as hereinafter fully set forth, in such a manner that it can be operated by means of horse-power, steam-engine, or other suitable motors to automatically lift, rotate, and drop a drill fixed on the end of a tube, to thereby form a vertical bore in the ground and through strata of rock and other hard substances, and also at the same time clean the bore, by pumping the detritus from the bottom and discharging it at a distance from the top and mouth of the bore, without stopping the drilling process or lifting the drill and tube from the bore at intervals, for the purpose of elevating ground and hard substances comminuted by the action of the drill.

Figure 1 of my accompanying drawings is a front elevation of my complete machine in position for operation. Fig. 2 is an enlarged view of the lower portion of Fig. 1, showing the tube-holding jaws open and the tube and drill removed. Fig. 3 is a top or plan view of my operative mechanism. Fig. 4 is a side view of the drill-operating mechanism. Fig. 5 is a longitudinal section of the vertical portion of Fig. 4. Fig. 6 is a transverse section of my reciprocating jaw-carrier. Figs. 7 and 8 are detail views of my jaw-operating device.

Jointly considered, these figures clearly illustrate the construction, operation, and utility of my complete invention.

A represents the base of my machine, in the form of a wooden frame adapted to be placed flat upon the ground, or a suitable level foundation immediately over the site where a bore is to be made.

A^2 are planks fixed across the top of the skeleton base, to support metal frames and operative mechanism.

A^3 are the posts of a derrick, detachably connected with the planks and base by means of pins *b*, that are fixed to the base and project upward into corresponding bores formed in the bottoms of the posts, as clearly shown in Fig. 2, or in any suitable way.

b' is a pulley in bearings fixed to the top of the derrick.

b'' is a rope that extends upward from a drum and passes over the pulley *b'*.

b''' is a grappling-tongs fixed to the end of the rope, for the purpose of seizing and lifting the tube and drill from the bore, or elevating sections of tubing to be coupled to the upper end of the tube in the bore at intervals, as the depth of the bore is increased.

B (clearly shown in Fig. 3) is a skeleton cast-metal frame, adapted to be fixed flat upon the base A A^2 by means of screw-bolts, to support horizontal shafts and gearing.

B^2 is a metal frame, fixed to the base at the front side, to support the driving-shaft and operative mechanism.

B^3 is a driving-shaft mounted in bearings formed in or attached to the metal frames B and B^2.

B^4 and B^5 are shafts mounted in the frame B in parallel position with the driving-shaft B^3.

No. 1 is a gear-wheel fixed to the driving-shaft B^3.

No. 2 is a gear-wheel fixed to the shaft B^5.

No. 3 is a balance-wheel fixed to the shaft B^4.

No. 4 is a pinion fixed to the shaft B^4.

No. 5 is a pinion fixed to the shaft B^5.

C is a crank-wheel fixed on the end of the driving-shaft B^3 that extends through an opening in the frame B^2.

C^2 is a reciprocating jaw-carrier that slides vertically in a bearing formed in or fixed to the front face of the metal frame B^2.

C^3 is a pitman that connects the jaw-carrier with the crank-wheel. *d d* are T-shaped jaws, that have concave faces adapted to engage a tube or round drill-stock. These tube-gripping jaws are hinged to the ends of levers *d'*, and the said levers are pivoted to the front face and opposite sides of the jaw-carrier C^2 by means of adjustable eccentrics *d''*, that have pivots *d'''* projecting outward and screw-bolts projecting inward, and that are inserted in circular cavities formed in the face of the carrier, and detachably connected with the jaw-carrier and within the circular cavities or bearings.

f f are metal springs fixed to the face of the jaw-carrier, as clearly shown in Fig. 8, in such a manner that they will, in their normal con-

dition, press upon the short arms of the levers d', to aid in keeping the pivoted jaws d engaged with the drill-stock in its upward motions.

g is an open eye and tube-bearing formed on or fixed to the top of the jaw-carrier C^2.

g' is a hinged section formed and attached to the open ring or eye in such a manner that it can be closed and fastened to aid in retaining a tube or drill stock in a vertical position, and readily opened to facilitate the removal of a tube-section from the machine.

$h\,h$ are bridles detachably and adjustably connected with the forward projections of the case of the metal frame B^2 by means of clamping-screws h', or in any suitable way to receive and govern the levers d'.

$i\,i$ are metal slides adjustably connected with the bridles h, to restrict the descent of the long arms of the levers d' relative to the bridles in which they are operated.

J is a drum placed loosely upon the driving-shaft B^3.

k is a sliding clutch upon the same shaft, by means of which the drum J is fixed to the shaft and rotated to operate the rope b'' when attached thereto, as required in raising and lowering tube-sections, or elevating the tube and drill from a bore.

m is a flexible tube attached to the top of the drill-tube r, to convey water and dirt from the tube and bore. The two parts are connected by means of a coupling or joint that will allow the tube r to rotate while the tube m is stationary.

In the practical operation of my machine thus constructed, I place it in position, as indicated by Fig. 1, and then, by means of a horse-power or other suitable motor, impart a rotary motion to the driving-shaft B^3 and the crank-wheel C on its end, to thereby transmit power and a reciprocating motion to the jaw-carrier C^2. At each upward motion of the jaw-carrier the jaws d will clamp fast to the tube between them, and carry it and the drill on its lower end upward until the long arms of the levers d', to which the jaws are hinged, strike the upper ends of the bridles h, when the said long arms are depressed, and the grip of the jaws upon the tube thereby relaxed to allow the tube to drop and by force of gravity operate the drill to form a bore in the center of a cavity previously made in the surface of the ground and filled with water. As the jaw-carrier descends at each revolution of the crank-wheel, the downward motion is arrested and restricted by the slides i on the bridles h. It is therefore obvious that the length of the stroke of the drill and tube can be readily regulated by simply raising and lowering the bridles relative to the frame, and the slides or stops i relative to the bridles h.

To change the position of the drill-point at each successive blow, I simply incline the bridles h in opposite directions relative to each other, so that they will, in combination with the levers d', perform the function of a spiral cam-groove or screw in rotating the jaw-carrier a fractional part of a revolution at each of its upward motions, to turn the tube and drill accordingly in the bore before it is dropped to strike a blow.

Until the drill reaches a water-bearing stratum it will be necessary to keep an artificial supply of water in the bore, to aid in carrying up the pulverized substances from the bottom of the bore and out of the way of the drill-point by means of a check-valve in the bottom of the tube as it is reciprocated in the bore, to perform the function of a lift-pump in elevating liquid matter from the bore.

I claim as my invention—

1. A portable base, A, the metal frames B and B^2, the driving-shaft B^3, the crank-wheel C, and a reciprocating jaw-carrier, C^2, arranged and combined in a drilling-machine, substantially as shown and described, to operate in the manner set forth, for the purposes specified.

2. The levers d', having jaws hinged to their ends, in combination with a reciprocating jaw-carrier, C^2, and bridles h, adjustably connected with the base of a drilling-machine, substantially as and for the purposes set forth.

3. The T-shaped jaws d, the levers d', the adjustable eccentrics d'', and the springs f, arranged and combined with the reciprocating jaw-carrier C^2, substantially as shown and described; for the purposes specified.

4. The jaw-carrier C^2, having an open ring, g, and a hinged section, g', at its top, and carrying a pair of levers, d', having tube-gripping jaws on their ends, in combination with a base or frame, B^2, having adjustable bridles h, substantially as shown and described, for the purposes specified.

5. The adjustable slides or stops i, in combination with the bridles h, and a reciprocating jaw-carrier having pivoted jaw-bearing levers extending their long arms through the said bridles, substantially as and for the purposes specified.

6. The improved rock-drilling and well-boring machine, composed of the following-named elements and sub-combinations, to wit: the portable base A A^2, the frames B and B^2, the driving-shaft B^3, having a crank-wheel on one end and a gear-wheel on the other, the shaft B^4, having a balance-wheel and a pinion, and the shaft B^5, having a gear-wheel and pinion, the reciprocating jaw-carrier having a tube-bearing, $g\ g'$, at its top, and carrying tube-gripping mechanism $d\ d'\ d''\ f$, the adjustable bridles h, having adjustable slides i, the detachable derrick having a pulley and rope, $b'\ b''$, a drum, J, and a clutch, k, substantially as shown and described.

WILLET C. WELLS.

Witnesses:

EARL BILLINGS,

CHAS. F. EDWARDS.