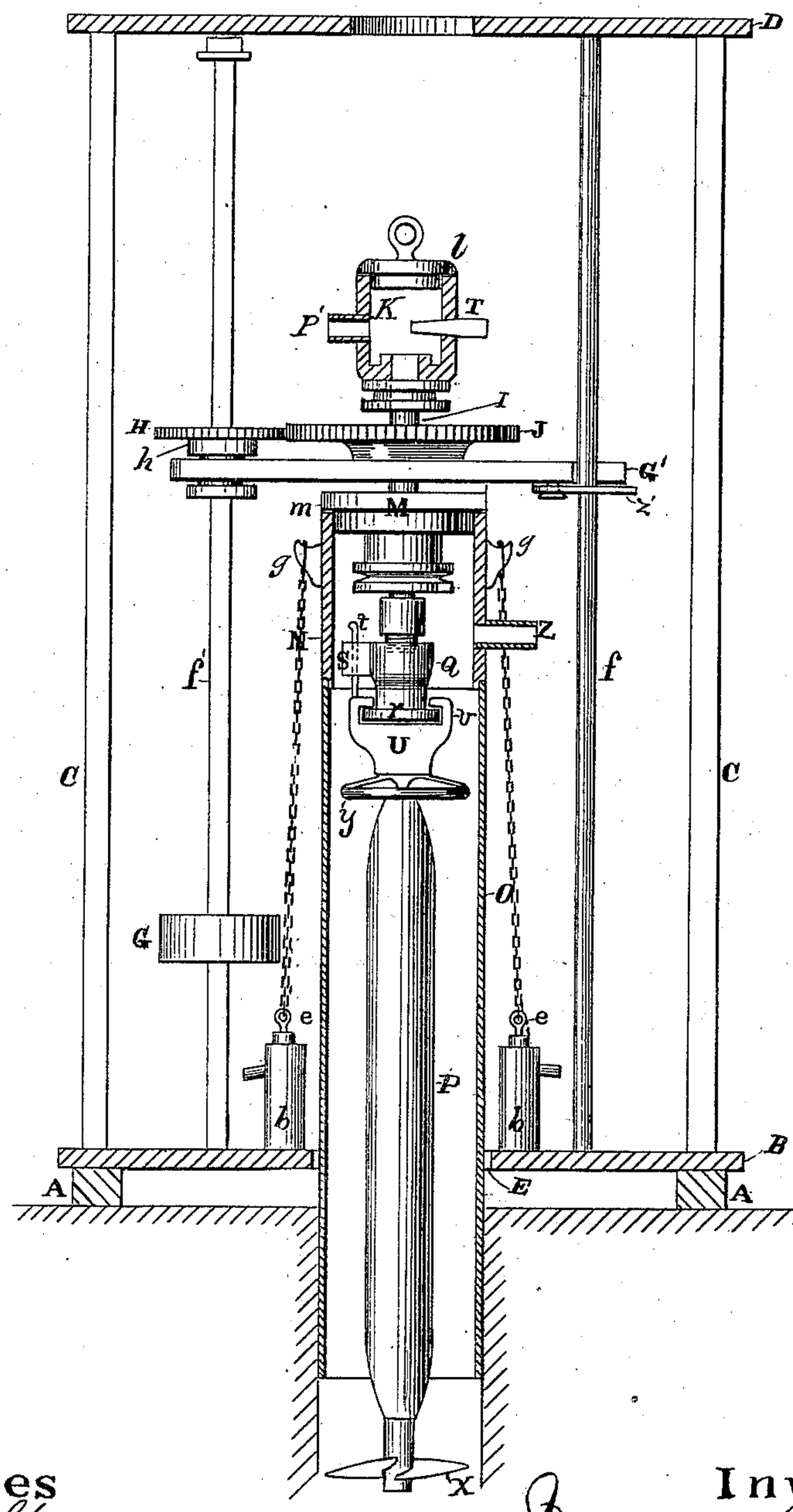
2 Sheets—Sheet 1.

J. HAAS & J. MANNING.

Well-Boring Machine.

No. 199,640. Patented Jan. 29, 1878.

Fig. 1.



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2 Sheets—Sheet 2.

J. HAAS & J. MANNING.

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Fig. 2.

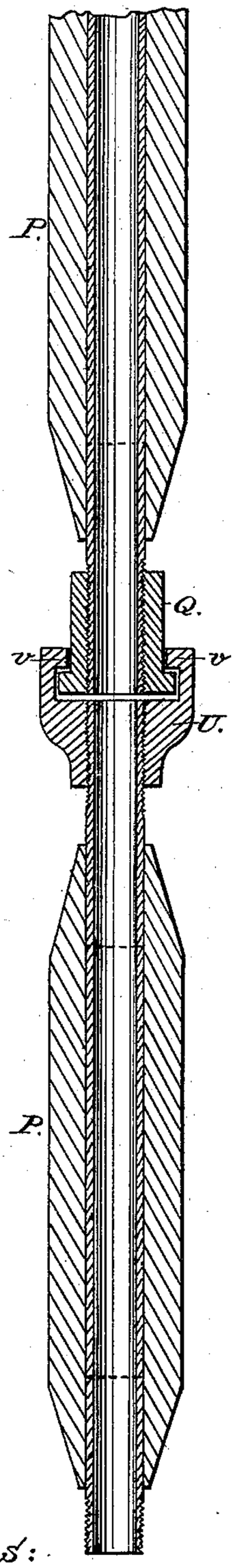


Fig. 3.

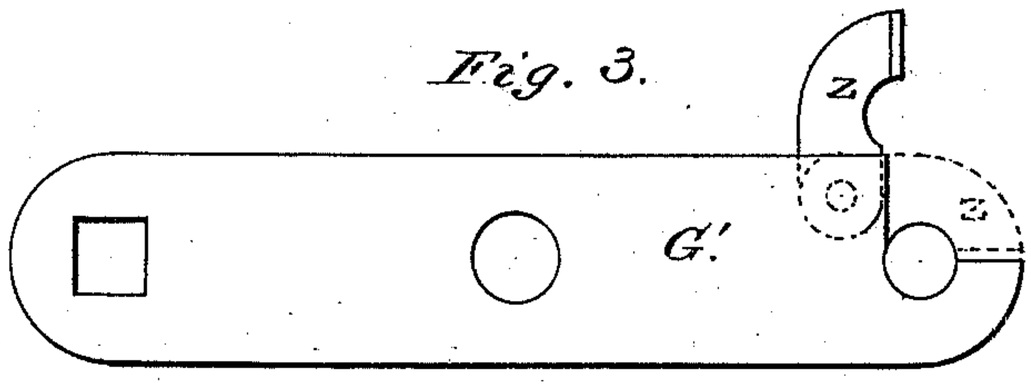


Fig. 4.

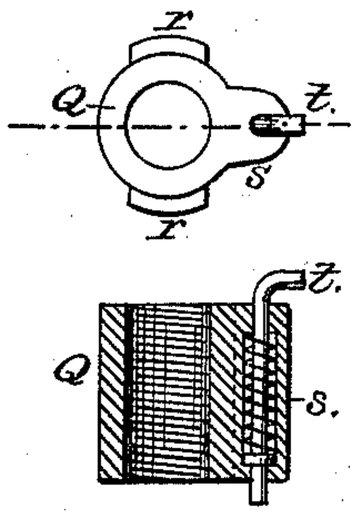
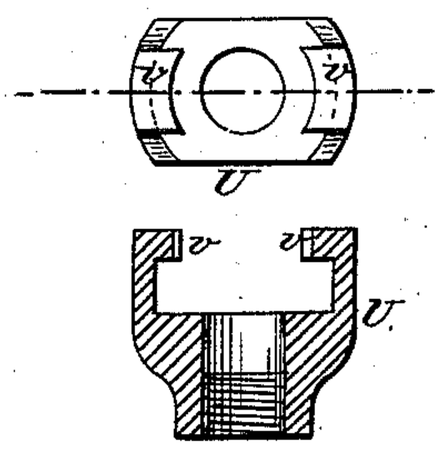


Fig. 5.



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UNITED STATES PATENT OFFICE.

JEROME HAAS AND JAMES MANNING, OF STOCKTON, CALIFORNIA.

IMPROVEMENT IN WELL-BORING MACHINES.

Specification forming part of Letters Patent No. **199,640,** dated January 29, 1878; application filed November 21, 1877.

To all whom it may concern:

Be it known that we, JEROME HAAS and JAMES MANNING, of Stockton, county of San Joaquin, State of California, have invented a Well-Boring Machine; and we do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use our said invention without further invention or experiment.

Our invention relates to an improved machine for boring wells and other holes in the earth; and it consists of the devices and arrangements hereinafter described.

Referring to the drawings, Figure 1 is a vertical section of our improved well-boring machine. Fig. 2 is a vertical section of the boring-tubes, showing the manner of coupling the same. Fig. 3 is a top and side view of the cross-head and locking device. Fig. 4 is a top and sectional view of one of the coupling-pieces, showing the spring-bolt. Fig. 5 is a top and sectional view of the other coupling-piece.

The base of the frame consists of two parallel sills, A A, which are connected at their middles by a cross plate or bar, B. An upright post or beam, C, is secured upon each sill A, at each end of the cross-plate B, and the upper ends of these beams are connected by a cross plate or beam, D. This frame we place over the spot where the well or other hole is to be bored. The lower cross-plate B has a hole, E, through its middle, which is as large as the casing of the well, and the boring implement and casing work down through it, as hereinafter described.

Vertical guide-rods *f f'* extend from the lower cross-plate B to the upper cross-plate D, one on each side of the hole E. One of these rods, *f'*, we use not only as a guide-rod, but also as a driving-shaft; and for this reason we prefer to make it square, simply for convenience in attaching the driving-wheel to it; but it could be made round, and the wheel could move on a feather along it, or both guide-rods could be made square.

We secure the pulley G, to which the power for driving the boring-auger is applied, upon the square rod or shaft *f'* near its lower end, and transmit the power to it by a belt-connection with the engine or other power used.

A toothed wheel, H, which has a hub or extension, *h*, on its lower side, has a square hole passing through it and its extension, so that it can slide freely up and down along the square driving-shaft. G' is a sliding cross-head, which is arranged to move up and down the guide-rods *f f'*, one end moving on the round guide-rod, while the opposite end is secured in a journal which is formed on the hub or extension *h* of the wheel H above mentioned, so that the wheel H and cross-head move together, and always preserve the same position relative to each other, while the wheel-hub rotates in the end of the cross-head.

A tube, I, passes vertically through a hole in the middle of the cross-head, and has a toothed wheel, J, secured horizontally upon it near its upper end, so that the wheel will rest upon the cross-head, and at the same time engage with the toothed wheel H, so that the power and rotary motion are transmitted by these wheels from the square shaft to the tube I.

A short tube, K, of large diameter, is secured by a loose coupling-joint to the upper end of the tube I above the wheel J, and this tube has a tight-fitting cover, *l*.

Upon the tube I, just below the cross-head, we place a loose block, M, which has a flange, *m*, projecting from its upper end. A short tube, N, of a diameter corresponding with the outer circumference of this flange, is then slipped on from below the tube I until its upper edge rests against the under side of the flange, while the upper end of the well casing or tube O fits against the lower edge of the tube N.

The boring-tube P is connected to the lower end of the tube I by a peculiar coupling, which is described as follows: Q is that portion of the coupling which screws onto the lower end of the pipe I. It is a short tube or nut with a projecting flange or rim, *r*, around its lower end. A portion of this flange is cut away on two opposite sides, and a projection, S, extends out from the nut, on one side, above one of these cut-away spaces. A spring pis-

ton or bolt, *t*, is placed in this side projection, so that it extends below the projection. The other part of the coupling which screws on the end of the boring-tube consists of a head, U, which has hooks *v* projecting upward from two opposite sides. To couple these two parts together, the hooks *v* are passed up on each side of the portion Q through the cut-away spaces, so as to press the piston or bolt *t* upward until the hooks can be turned around over the flanges *r*. The piston or bolt *t* is then forced down by its spring, so as to serve as a stop to prevent the hooks from rotating past it. To uncouple the parts, the spring-piston is raised, so as to let the hooks pass under it, when it can be removed through the cut-away portions.

This coupling is very simple in construction, and is easily coupled and uncoupled. We use it for connecting all our rods by attaching the nut Q to one end and the part U to the other end of each section of the boring-rod. Each section of the boring-rod we make of a large wooden tube, which is made tapering at its ends, as shown in the drawings, and the metal tube or lining to which the parts of the coupling are attached projects from its ends.

Our object in making these sections of a large diameter is to decrease the area of the annular space between them and the casing-tube which fits over them, for the purpose hereinafter specified.

The boring instrument or auger X is attached to the lower end of the lowermost section, and it can be made in any of the approved shapes and styles; and as the entire boring-rod is rotated inside of the case or tubing O, I place a loose wheel, Y, on the end tube of each section. This wheel is slightly larger in diameter than the body of the section, so that it will prevent the body of the section from striking the casing.

The short tube N, which fits over the boring-pipe, and against which the upper end of the casing-tube fits, has a spout or tube, Z, projecting from it, while the tube K at the top of the pipe I has a tube projection, T, on one side of it, as shown.

The tube projection T communicates with the interior of the boring-pipe, while the tube projection Z communicates with the space between the boring-pipe and well-casing. Our method of boring consists in rotating the boring-pipe, so as to cause the auger X to cut up the earth in the bottom of the bore, while a stream of water is fed down against the earth, so as to loosen it and carry it off as fast as it is free. The stream of water may be forced through the tubular projection T, and down the boring-tube against the bottom of the bore, and discharged upward through the annular space between the boring-tube and well-casing, and escape through the spout or tube Z; or, if preferred, it might be forced down through the well-casing by tube Z, and out through the spout T. The horizontal wheel Y, which prevents the boring-tube from coming in contact with the well-casing, we make with openings, as represented, so that the water and material will pass readily up through them.

Our object in making the sections which form the boring-pipe large in diameter is to reduce the area of the space between the boring-rod and well-casing, and thus increase the water pressure or current to more nearly correspond with the area of the passage through the boring-tube.

We shall usually force the water down outside of the boring-pipe and discharge it up through the boring-pipe; and in order to assist the discharge, we insert a steam-nozzle, T, through the tube K, opposite the discharge-spout P′, so that it will point into the discharge-spout, so as to form an injector. A steam-pipe connects with this nozzle T, and a jet of steam is forced into the discharge of the water and material, thus creating a larger upward flow than that which passes down between the boring-tube and casing, thereby giving greater effect to the current of water.

Upon the cross-plate B, on each side of the hole E, we place a hydraulic jack, *b*, the pistons of which pull downward. The piston-rods *e* we connect, by strong chains or cables, with ears or lugs *g* on the short cap-tube N, against which the upper end of well-casing fits, so that as the boring proceeds water will be forced into the hydraulic cylinders, so as to force the pistons downward, and thus draw the casing downward in the well. The end of this cross-head G, which clasps the round guide-rod *f*, is made with a hinged portion, Z′, which can be thrown open, so as to release the end of the cross-head and permit it to be turned around from between the uprights. This is necessary in order to attach new sections of boring-rod and well-casing.

This machine is very simple in its construction and operation. We employ steam-power for operating it, and its work is continuous. The water for loosening and discharging the material we supply by means of a pump or otherwise.

Having thus described our invention, we claim and desire to secure by Letters Patent—

1. The guide-rod *f′*, mounted vertically as a shaft, and provided with the fixed driving-pulley G and sliding toothed wheel H, with its hub-extension, in combination with the sliding cross-head G′, with its boring-tube I and toothed wheel J, one end of said cross-head having a bearing on the hub-extension of the wheel H, so that the wheel and cross-head move together, substantially as and for the purpose above specified.

2. The vertical tube I, mounted in the sliding cross-head G′, and provided with the coupling-piece Q at its lower end, and a closed box, K, with its spout P′, at its upper end, and having the flanged block M and tube N below the cross-head, in combination with the extensible boring sectional tubes P and well-casing O, all combined and arranged to oper-

ate substantially as and for the purpose described.

3. The boring-tube sections P, having a large diameter and reduced ends, substantially as and for the purpose described.

4. The improved rod or tube coupling consisting of the part Q, with its flange or rim *r* cut away, as described, and having the projection S, with its spring bolt or piston *t*, in combination with the head U, with its opposite hooks *v*, substantially as and for the purpose described.

5. The loose block M, with its flange *m*, carried upon the tube I, in combination with the short tube N, with its spout Z and well-casing, substantially as and for the purpose described.

6. The hydraulic jack *b*, secured upon the cross-plate B, in combination with the short tube N, with its lugs or ears *m*, and the connecting chains or cables, substantially as and for the purpose described.

In witness whereof we have hereunto set our hands and seals.

JEROME HAAS. [L. S.]
JAMES MANNING. [L. S.]

Witnesses:
PHILIP B. FRASER,
H. H. HEWLETT.