

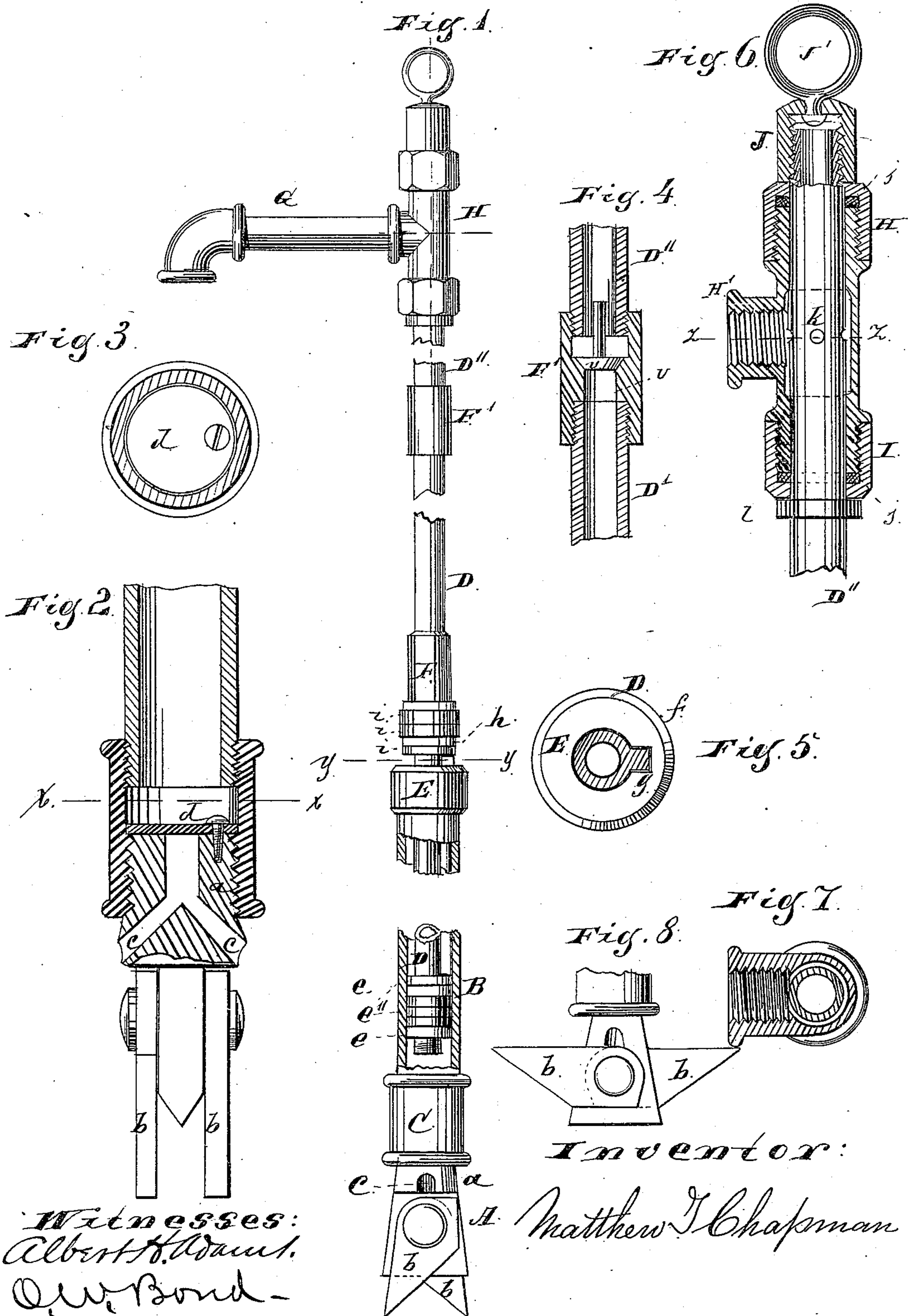
(No Model.)

M. T. CHAPMAN.

TUBE WELL AND PUMPING MECHANISM FOR THE SAME.

No. 309,926.

Patented Dec. 30, 1884.



UNITED STATES PATENT OFFICE.

MATTHEW T. CHAPMAN, OF AURORA, ILLINOIS.

TUBE-WELL AND PUMPING MECHANISM FOR THE SAME.

SPECIFICATION forming part of Letters Patent No. 309,926, dated December 30, 1884.

Application filed June 16, 1884. (No model.)

To all whom it may concern:

Be it known that I, MATTHEW T. CHAPMAN, residing at Aurora, in the county of Kane and State of Illinois, and a citizen of the United States, have invented new and useful Improvements in Tube-Well and Pumping Mechanism for the Same, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation, the tubing being broken and the lower end of the exterior tubing being in section; Fig. 2, a detail showing the drill-head, coupling, and exterior tubing in section; Fig. 3, a cross-section on line *x x* of Fig. 2; Fig. 4, a detail showing a section of the tube and one of the lifting-valves; Fig. 5, a cross-section on line *y y* of Fig. 1; Fig. 6, a detail in section of the upper end of the tubing, showing the piston-rod in elevation; Fig. 7, a cross-section on line *z z* of Fig. 6; Fig. 8, a detail showing the wings of the drill expanded, Fig. 1 showing them closed.

This invention relates to devices for boring a hole for the purpose of sinking a tube for a tube-well, and has for its objects to enable the rod which operates the drill to be utilized as a pump cylinder or tube by having such rod independent of a lifting-rod; to insure the lifting and removal of the water, sand, cuttings, and débris during the operation of sinking the hole without interfering with the operation of the drill; to produce a rotation of the drill-rod and drill without at the same time rotating the discharge-pipe; to improve the devices for driving sections of the tubing as necessary, and to improve, generally, the construction, arrangement, and operation of the several parts by which the hole is bored, the water, sand, cuttings, and other débris removed, and the tubing for the well driven; and its nature consists in the several devices hereinafter described, and specifically pointed out in the claims as new, for attaining the objects sought.

In the drawings, A represents a drill formed of a head, *a*, and expansible wings *b*, the head at the upper part being hollow, and provided with one or more holes, *c*, for the passage of water. This drill and its construction is not

herein claimed, as it is to be made the subject-matter of another application to be filed herewith, and is only shown herein to illustrate a drill in connection with the other devices, it being, however, expressly understood that other forms of drills can be applied and used with the devices herein shown.

B represents a hollow drill stock or stem.

C represents a coupling screw-threaded on its interior, and adapted to receive the lower end of the stock B, having a corresponding screw-thread, and the upper end of the drill-head *a* likewise screw-threaded, to connect the stock or stem with the drill, as shown in Fig. 2. The stock B is made of iron tubing or other suitable material.

D represents sections of iron tubing or other suitable material, forming a hollow lifting or piston rod. The lower end of the section D of the piston-rod has secured thereto a piston, which enters and fits the opening in the drill stock or stem B, as shown in Fig. 1, which piston may be formed, as usual, of plates or heads *e*, between which are elastic or packing rings or heads *e'*.

E represents a cap or stuffing-box on the upper end of the drill-stock B, and provided with an opening for the passage of the rod or tube D. This cap at its top or closed end has an opening, *g*, which receives a spline or projection, *f*, on the exterior wall of the tube D, by means of which spline and opening the tube and cap E are locked together, so that as the rod is rotated it will impart rotation to the drill-stock and drill. The cap may be provided with an interior screw-thread corresponding to an exterior one on the stock or stem B, by means of which the cap can be secured to the stem.

F represents couplings for connecting the adjoining ends of the sections D of the piston-rod, each coupling being screw-threaded upon its interior to receive the screw-threaded ends of the rod-sections, as shown in Fig. 4, and each coupling is provided with a contracted portion, *u*, on which is formed a valve-seat for a valve, *v*, the stem of which lies upward in one of the drill-rod sections, as shown in Fig. 4, so that the valve can be raised from its seat

for the passage of the matter to be discharged through the piston-rod D. The opening in the drill-head *a* is closed by a flap-valve, *d*, attached to the upper end of the head, as shown in Figs. 2 and 3, and this valve, in connection with the valves in the couplings or chambers F, furnishes the means for controlling the passage of the water and other materials through the piston-rod to the discharge. The lower section of the piston-rod, at a point just above the stuffing-box E when the piston is down, is provided with metal collars *h*, between which collars are rubber rings *i*, a rubber ring being also provided around the piston-rod below the under collar *h*, as shown in Fig. 1, which rings and collars furnish a bumper for striking the stuffing-box E and forcing the drill-stock and drill down.

G represents a discharge-nozzle, through which the material raised by the piston-rod is emptied onto the surface of the ground or other receptacle.

H represents a casing located around the piston-rod D in such manner as to be free to rotate on the piston-rod or allow the piston-rod to rotate therein. This casing H is provided with a suitable opening, H', to receive the end of the discharge-pipe G.

I represents stuffing-boxes—one at each end of the casing H—between the face of which and the end of the casing is a packing, *j*, of suitable material, and, as shown, the end of the lower stuffing-box rests upon a collar, *l*, on the upper section of the piston rod or tube D, which collar is secured in any firm manner to furnish a support that will hold the casing H from slipping down on the rod. The interior of the casing H, at a point in line with the discharge, is enlarged somewhat to form a chamber, and the section of the piston-rod within this casing at a point in line with the enlarged portion is provided with a series of openings, *k*, to allow of the passage of the water and other material from the piston-rod in the chamber and out at the discharge.

J represents a head having a central screw-threaded opening to receive the upper end of the piston-rod having a corresponding screw-thread. This head J is provided with a ring or eye, J', for the attachment of a rope or other lifting device by which the piston-rod can be raised. The rope for raising the piston-rod passes up over a pulley or wheel located on a derrick or other support, and thence down to a windlass, as usual, by means of which rope and windlass the rod can be lifted to the desired height, and then dropped by allowing the windlass to run free. This part of the apparatus is not shown, as it may be of any of the usual and well-known forms of construction.

In use the hoisting-rope is to be attached to the ring J', or connected in some other suitable manner with the upper end of the combined lifting and piston rod D, and this rope is to be wound on its windlass in the usual

manner, raising the rod D the required height, when the windlass is to be tripped, as usual, allowing the rope to fall, causing the drill to strike and be operated in the usual manner. The rod D can be raised until the piston on its end comes in contact with the under face of the cap E, when the further lifting of the rod will raise the drill-stock B and the drill attached thereto, and the weight of these parts and the rod, when the rope is released, will cause a rapid descent, by which the drill will be forced into the resisting material which is to be removed.

The operation of drilling at the same time causes the removal of the water, sand, and debris cut away through the pump or piston rod D, through the raising and dropping of such rod, in connection with the valves *d* and the valves in the chambers or couplings F. The elevating of the rod opens the valve *d*, allowing the water, sand, and other material to pass through the openings or channels *c* into the chamber of the drill-stock B above the valve *d*, and the descent of the rod D closes this valve *d*, and at the same time opens the valves in the chambers or couplings F, allowing the water, sand, and other material to pass from the chamber in the drill-stock B up through the drill-rod D above the valves in the chambers or couplings F, and the valves in these chambers will be closed by the ascent of the rod, holding the water, sand, and other material which has passed the valves above such valves. The continued operation of raising and dropping the drill or piston rod D opens and closes the valves, as above described, forcing the water up with the sand and other material and discharging it through the pipe G.

By providing several valve-chambers, F, each having a valve therein, the accumulation of too much sand and debris on the lower valve will be prevented, as the lower valve will only support such portion of the sand and debris as is being raised as will be contained in the space between it and the next succeeding valve, and as many of these valve-chambers F and valves *d* are to be provided as may be required for the work to be performed. As the hole which is being bored is sunk deeper additional sections of the rod D are to be added to suit the increase in depth. The water, sand, and other material raised through the hollow rod D pass out therefrom through the orifices *k*, and thence into the chamber in the casing H, and out at the discharge G. The casing H being supported around the rod D and independent of that rod, it will be seen that the rod can be rotated to cause the drill to act without affecting the casing and discharge, which remain stationary; and as the drill-stock and the rod D are connected, the drill will be rotated with the rod, so that its point will not strike repeatedly in the same place.

I do not herein claim the valves arranged within the lifting tube or rod, and having

stems projecting upwardly into the said tube or rod, as such will constitute the subject-matter of a separate application.

What I claim as new, and desire to secure
5 by Letters Patent, is—

A hollow lifting-rod provided with discharge-holes *k*, in combination with the pipe H, loosely placed upon the lifting-rod, and

having its interior communicating with the holes *k*, for rotating the lifting-rod without rotating the discharge-tube, substantially as and for the purpose specified. 10

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Witnesses:

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ALBERT H. ADAMS.