

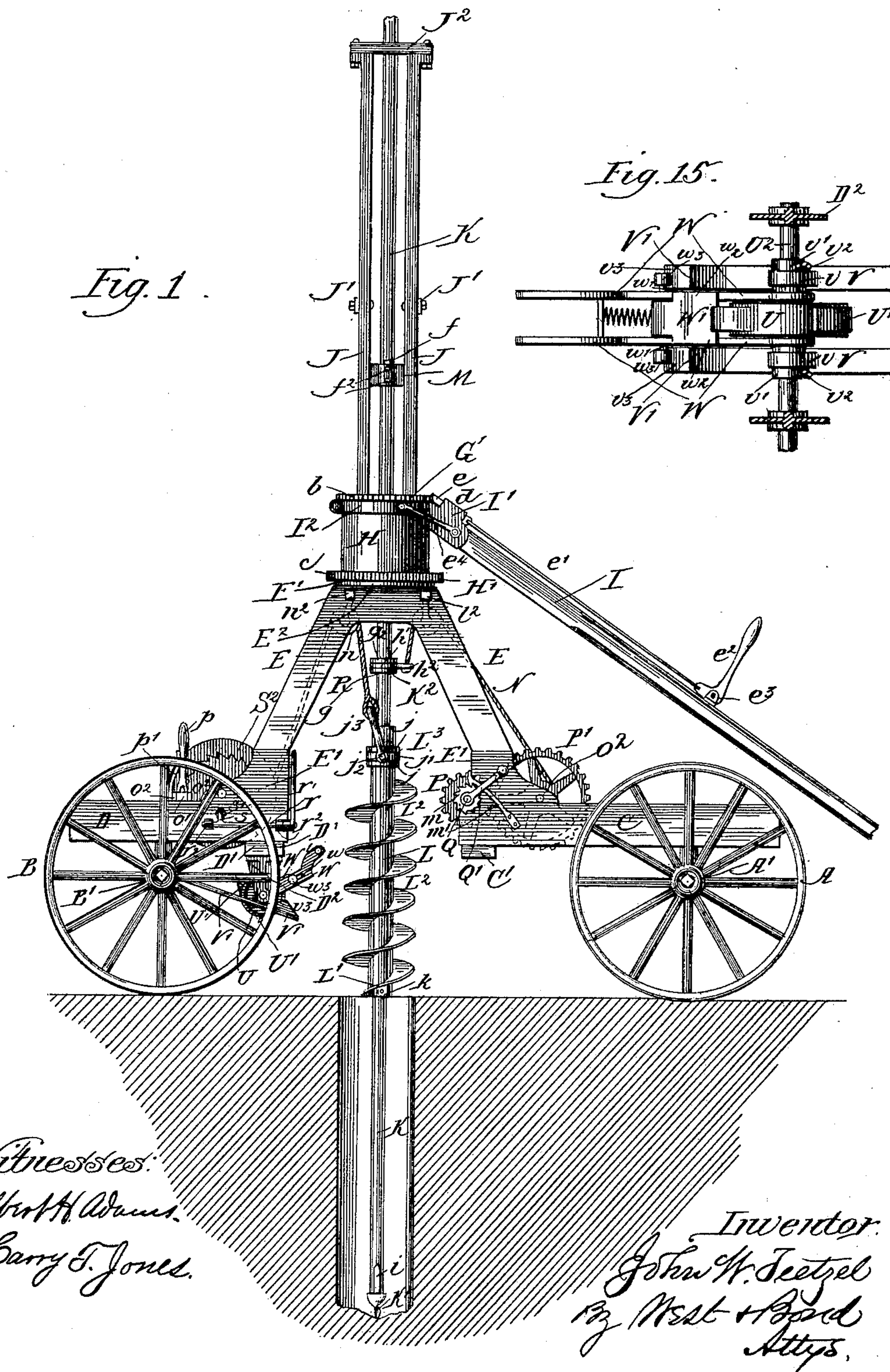
(No Model.)

4 Sheets—Sheet 1.

J. W. TEETZEL.
WELL BORING MACHINE.

No. 435,593.

Patented Sept. 2, 1890.



Witnesses:
Albert H. Adams.
Harry F. Jones.

Inventor:
John W. Teetzel
By West & Board
Attys.

4 Sheets—Sheet 2.

No. 435,593.

Patented Sept. 2, 1890.

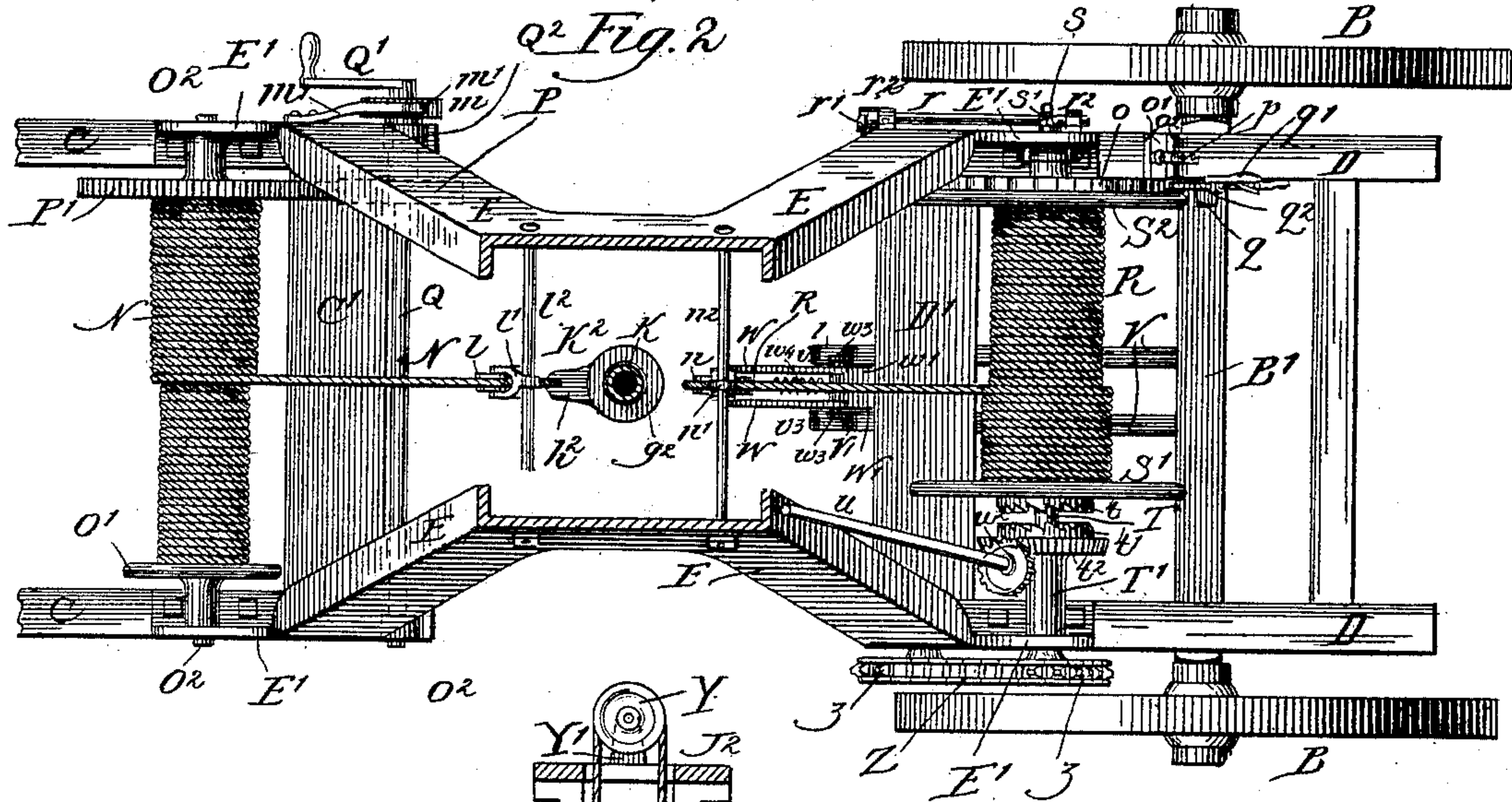
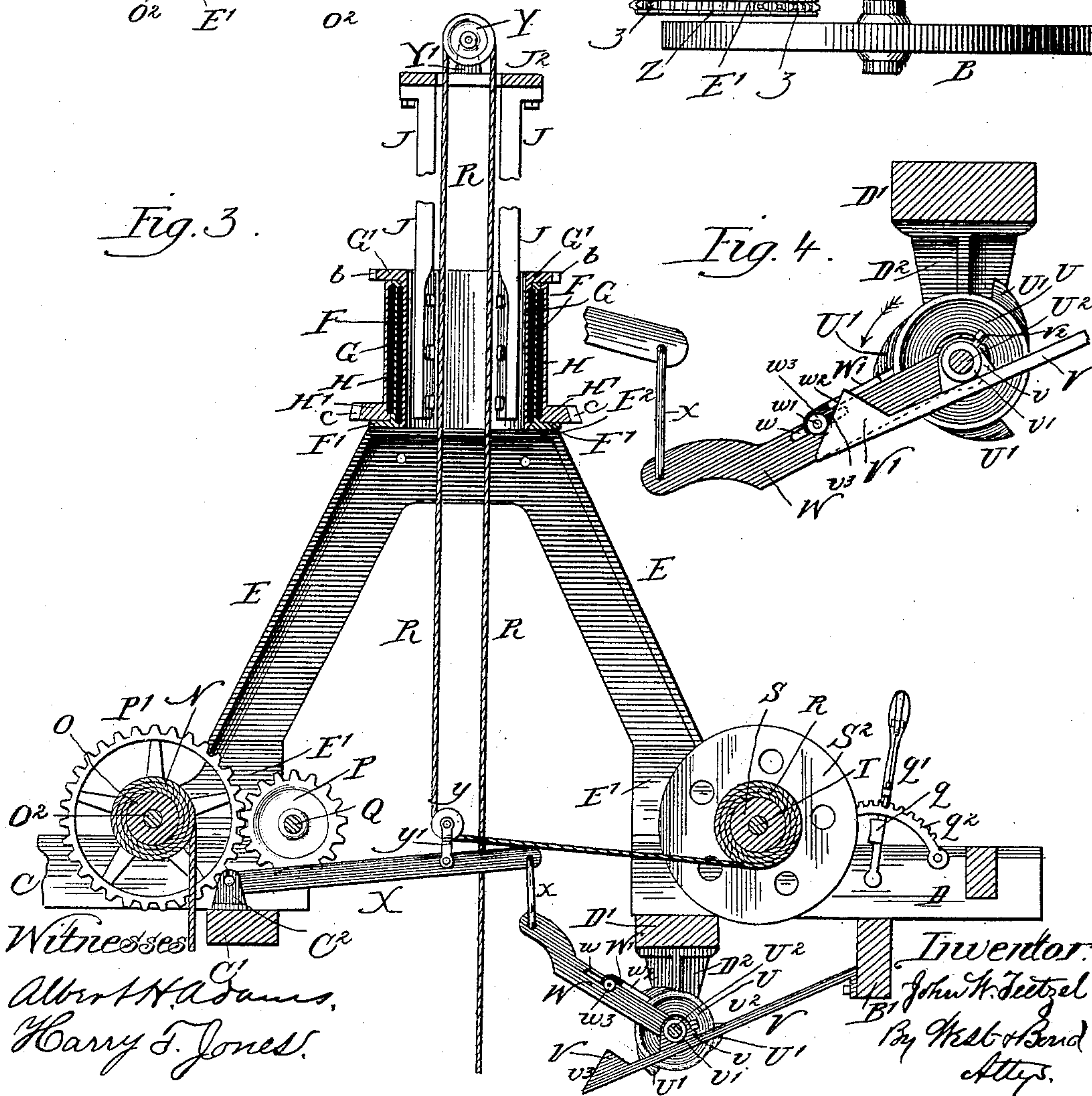



Fig. 3.

Fig. 4.



Witnesses  Cr
Albert H. Adams,
Harry F. Jones.

Inventor:
John H. Teitzel
By West & Bond
Attys.

(No Model.)

4 Sheets—Sheet 3.

J. W. TEETZEL.
WELL BORING MACHINE.

No. 435,593.

Patented Sept. 2, 1890.

Fig. 5.

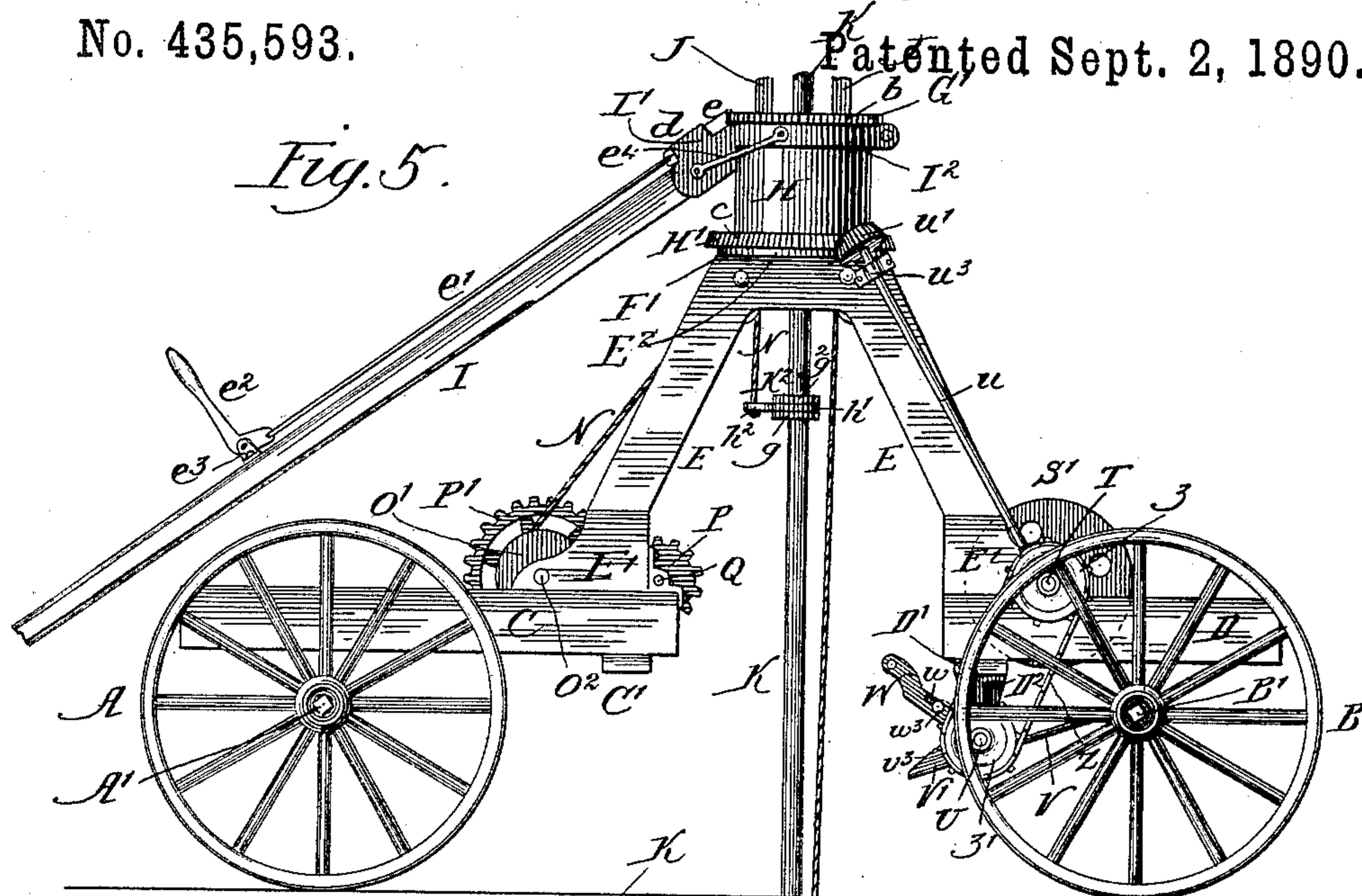
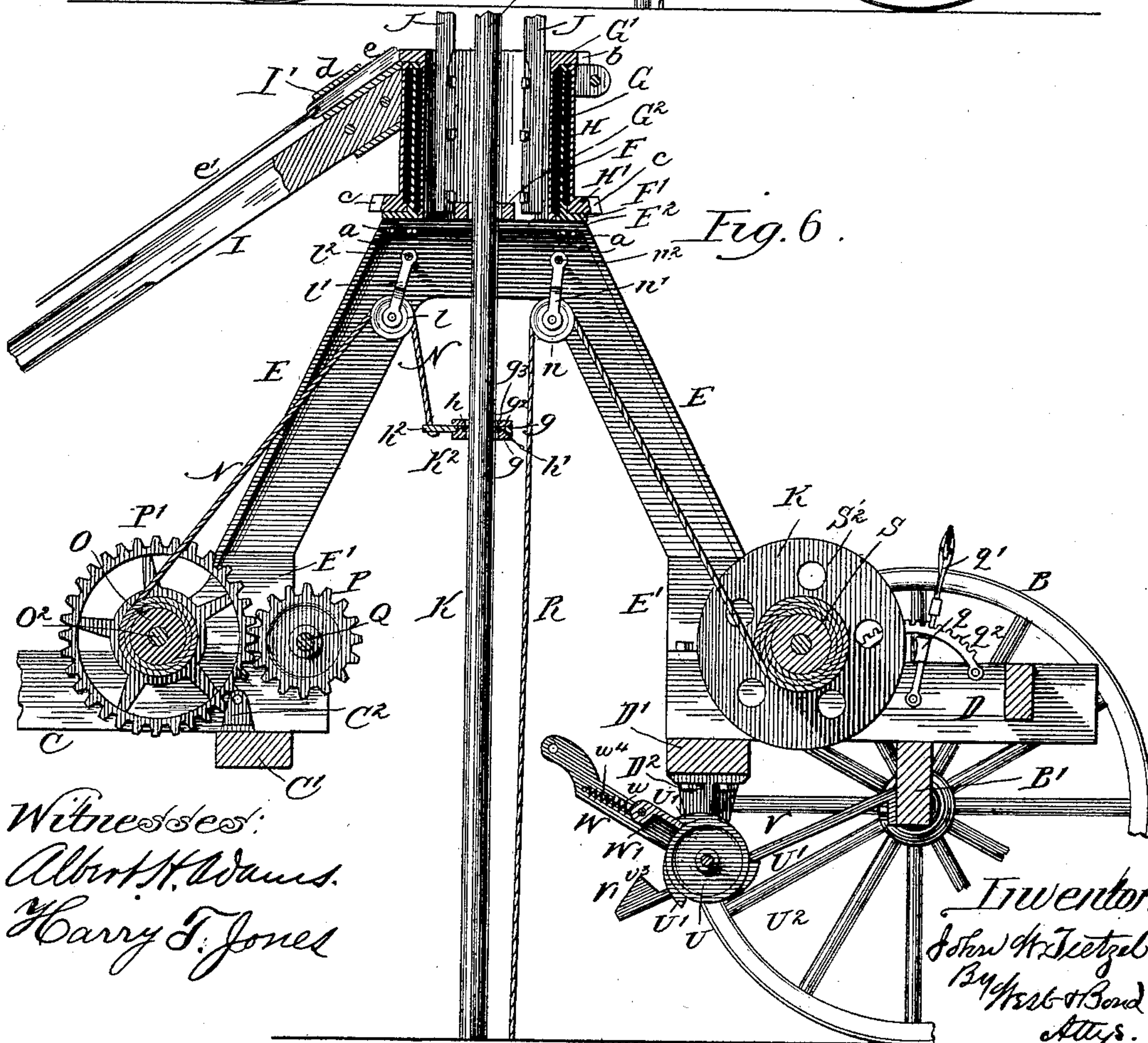


Fig. 6.



Witnesses:
Albert H. Adams.
Harry T. Jones

Inventor:
John W. Teetzel
By [Signature] & Bond
Atty.

(No Model.)

4 Sheets—Sheet 4.

J. W. TEETZEL.
WELL BORING MACHINE.

No. 435,593.

Patented Sept. 2, 1890.

Fig. 7.

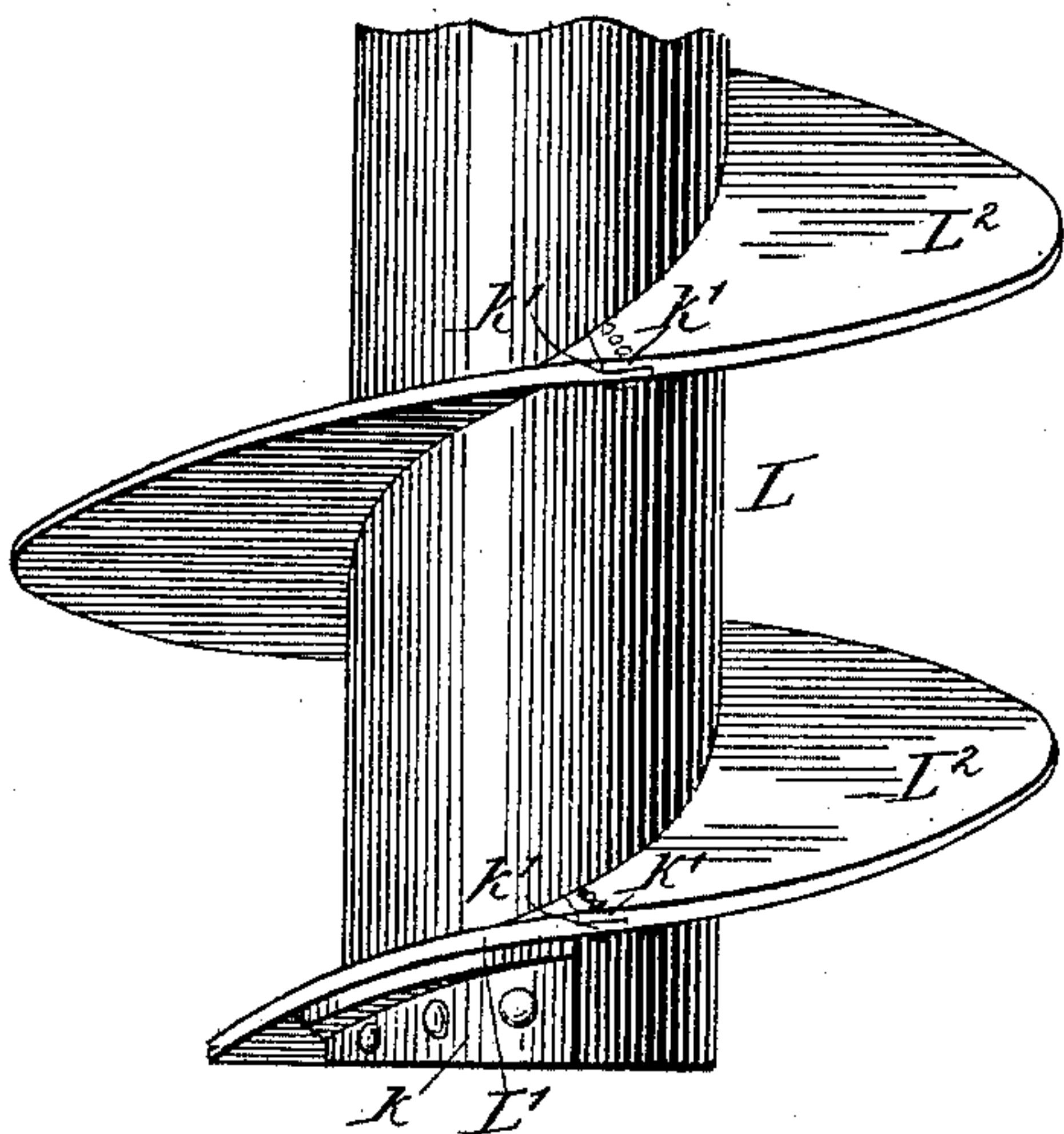


Fig. 8.

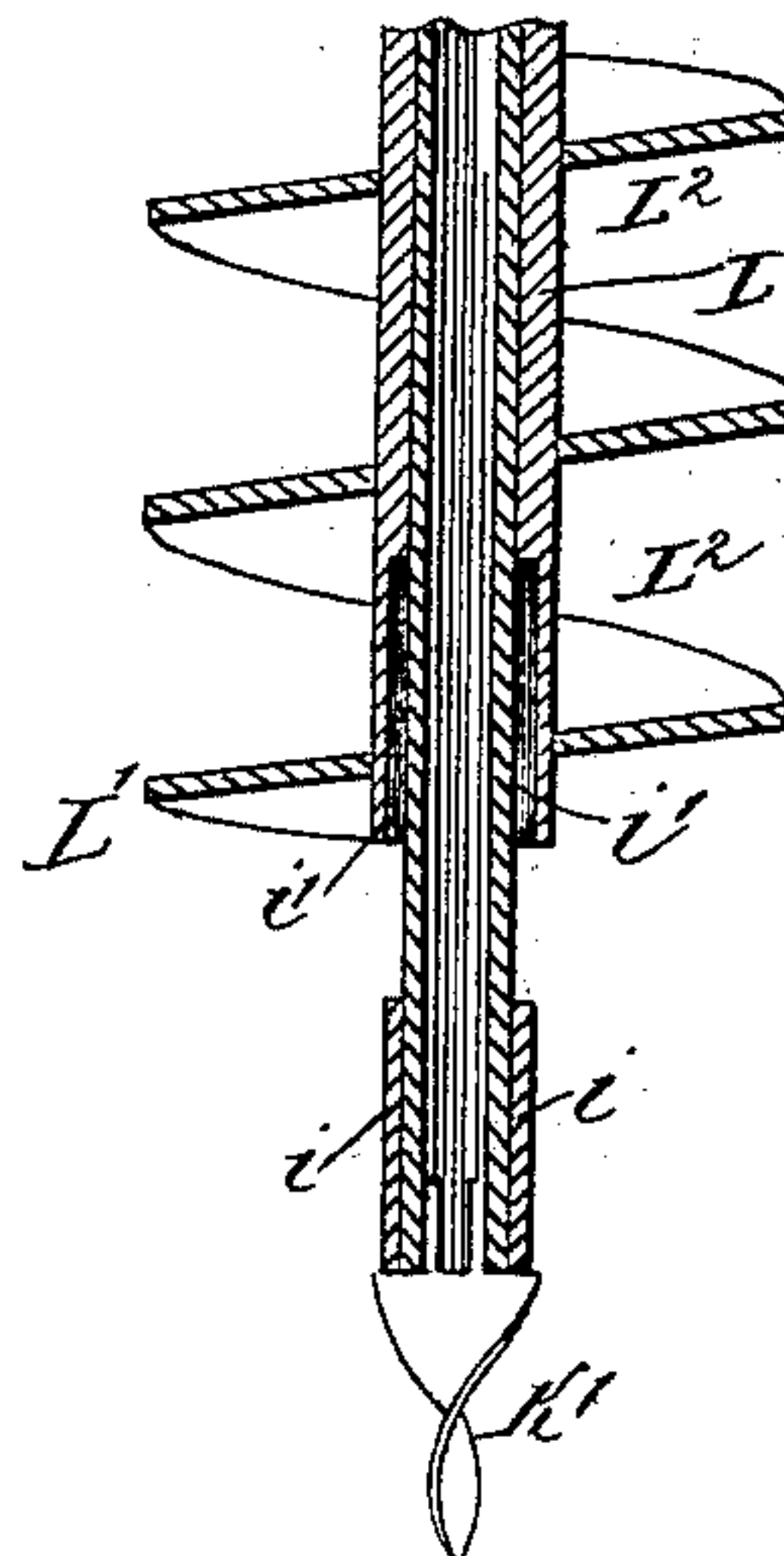


Fig. 9.

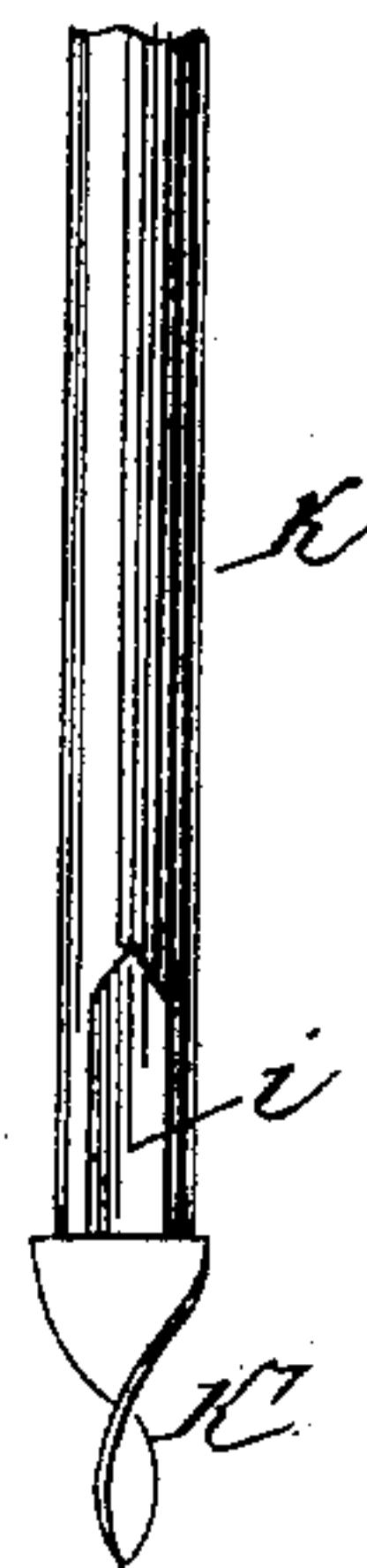


Fig. 10.

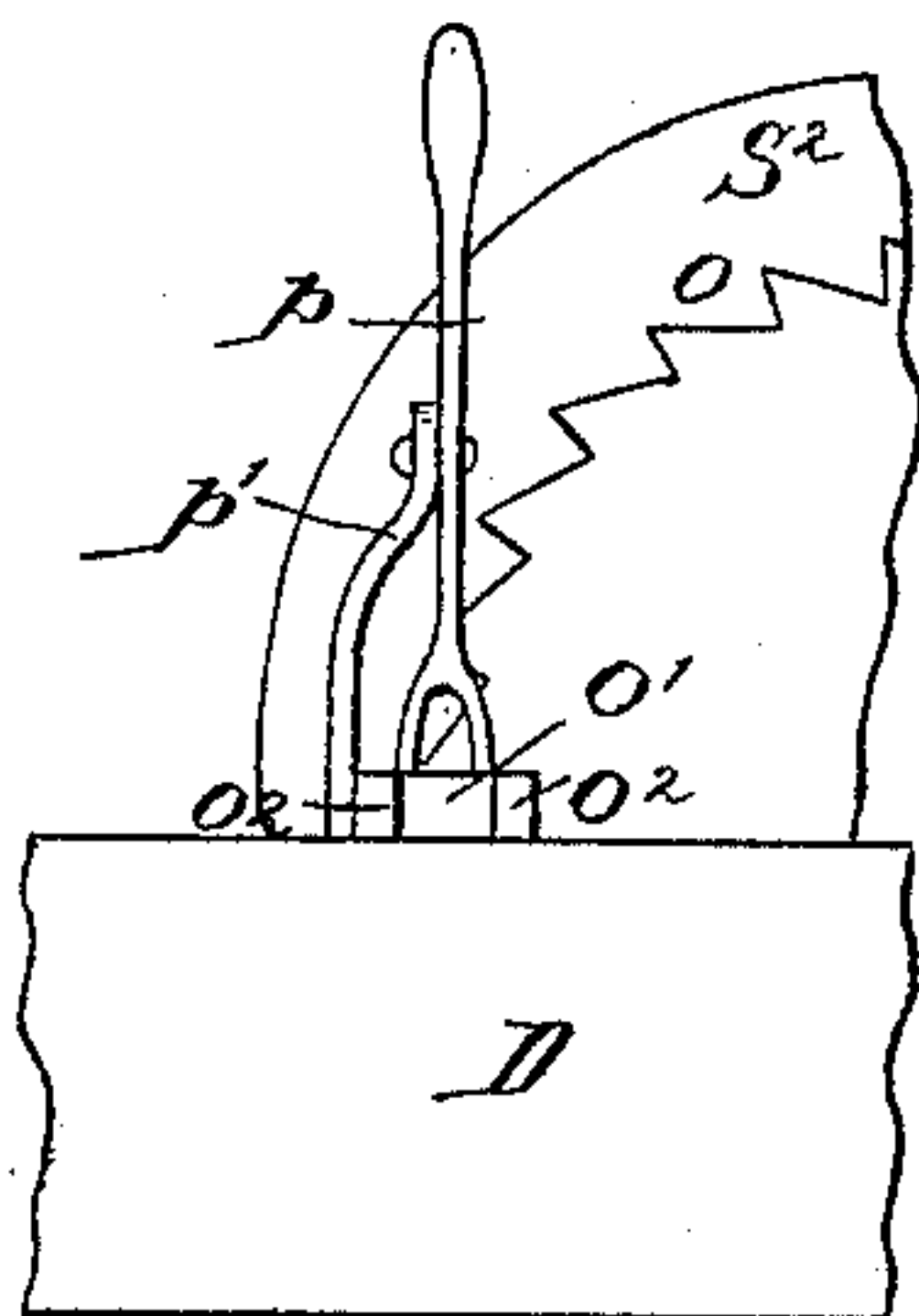


Fig. 11.

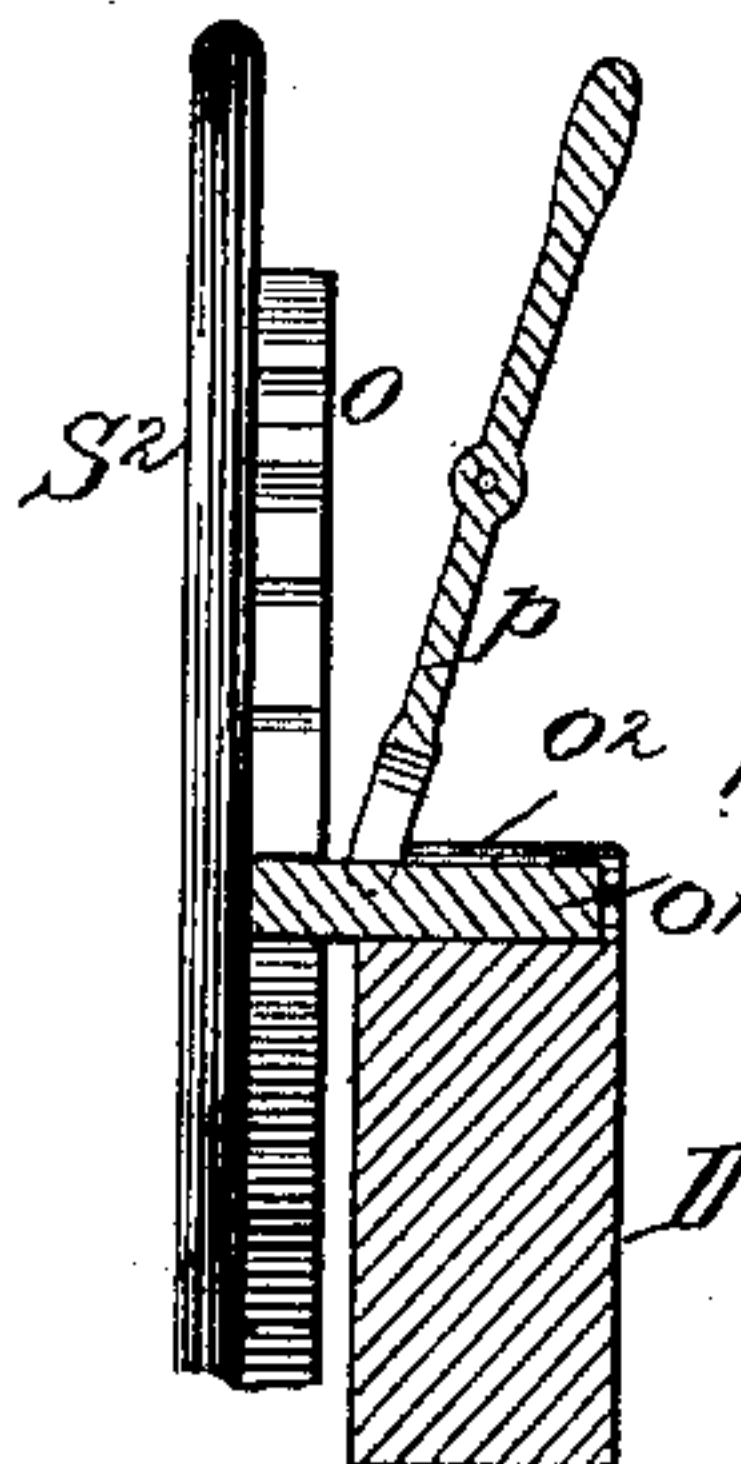


Fig. 12.

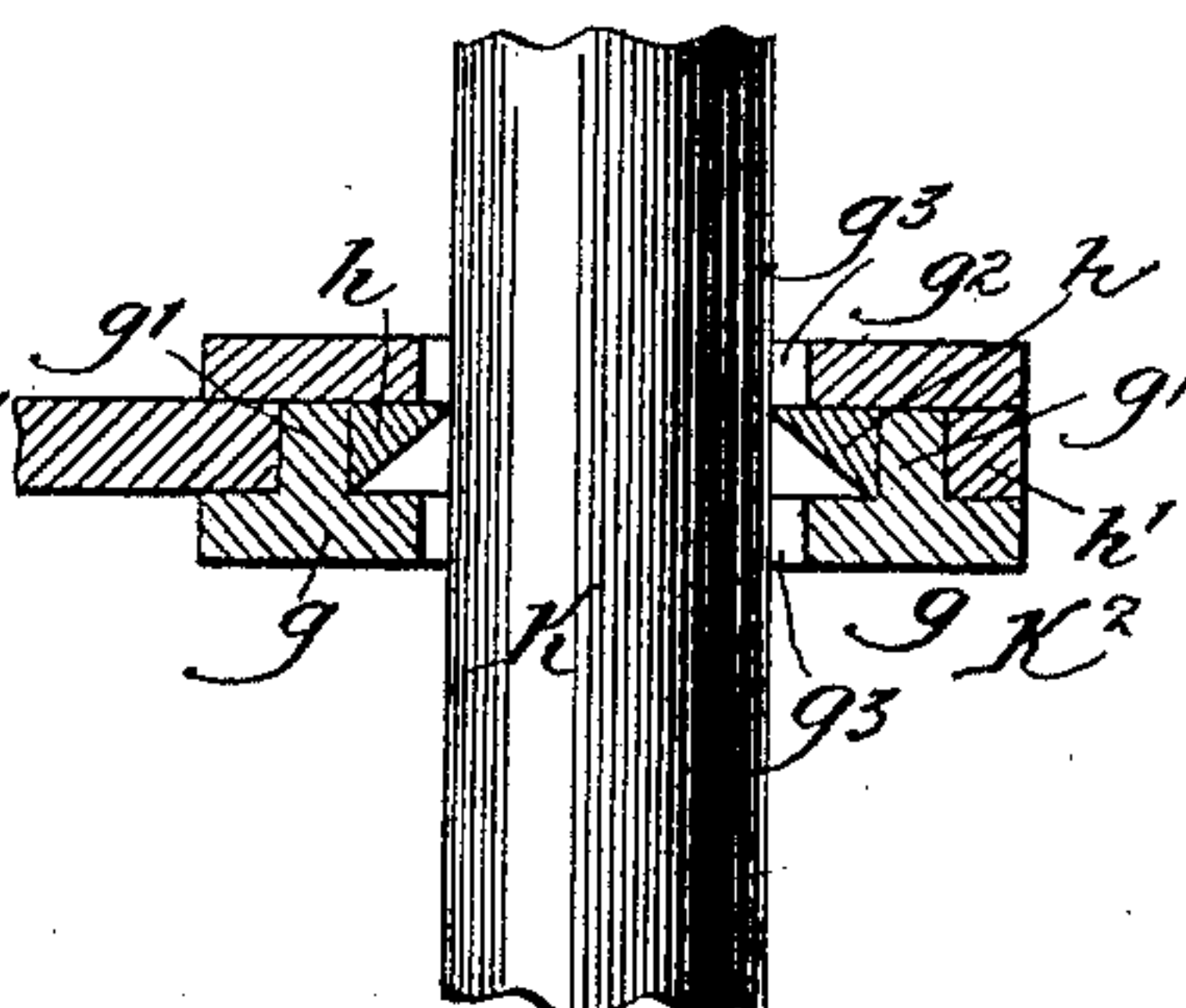


Fig. 13.

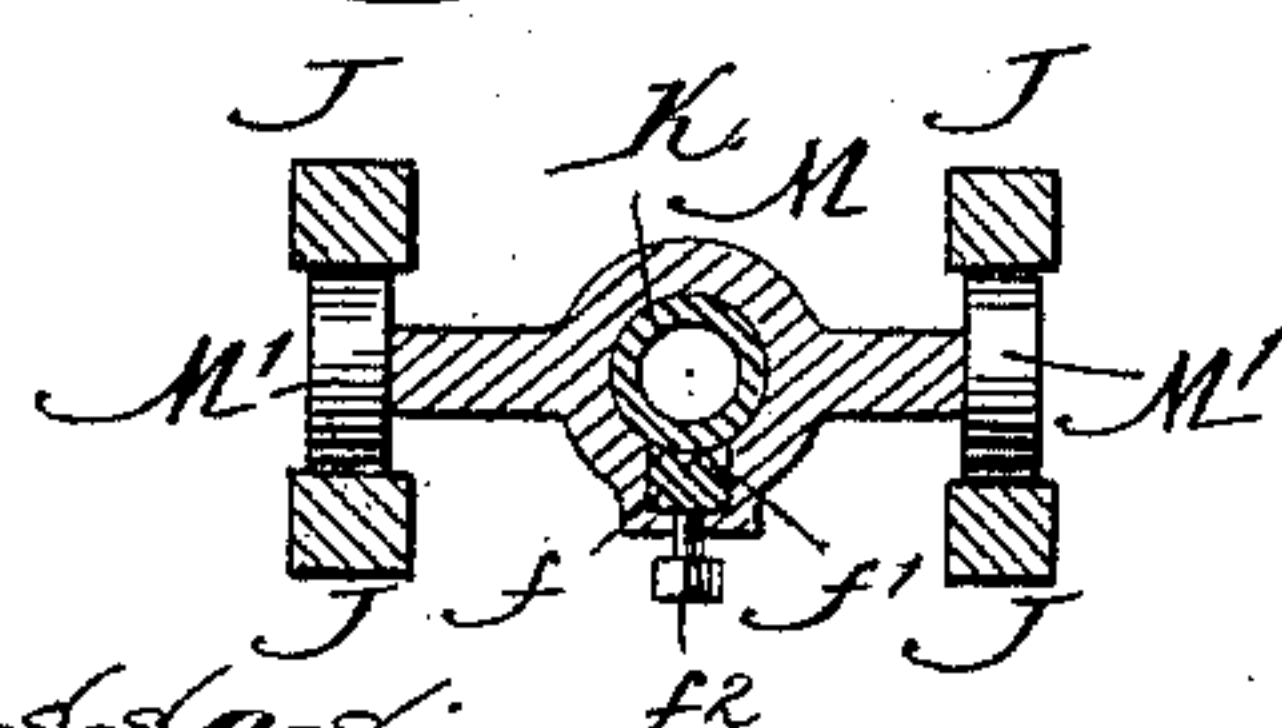
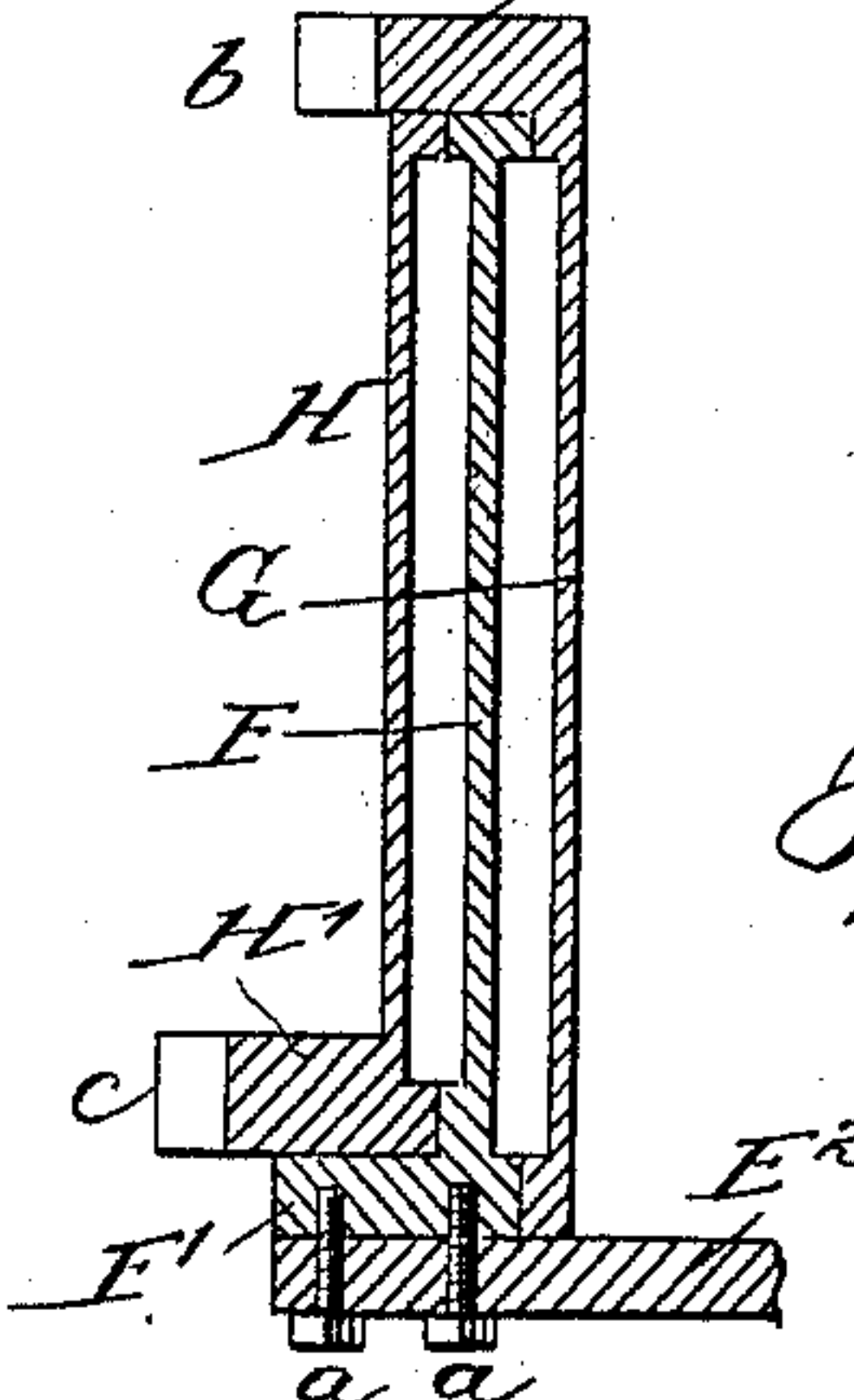


Fig. 14.



Witnesses:
Albert H. Adams.
Harry T. Jones.

Inventor:
John W. Teetzel
By West & Bond
Attys.

UNITED STATES PATENT OFFICE.

JOHN W. TEETZEL, OF OTTAWA, ILLINOIS.

WELL-BORING MACHINE.

SPECIFICATION forming part of Letters Patent No. 435,593, dated September 2, 1890.

Application filed March 23, 1888. Serial No. 268,246. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. TEETZEL, a citizen of the United States, residing at Ottawa, in the county of La Salle and State of Illinois, have invented a new and useful Improvement in Well-Boring Machines, of which the following is a specification, reference being had to the accompanying drawings, in which—

10 Figure 1 is a side elevation. Fig. 2 is a top or plan view with the derrick portion removed. Fig. 3 is a longitudinal section. Fig. 4 is a detail showing the trip for the drill walking-beam. Fig. 5 is a side elevation, 15 showing the opposite side of the machine from that shown in Fig. 1, with the derrick broken off. Fig. 6 is a longitudinal section showing the arrangement for operating an auger-drill, Fig. 3 showing the arrangement 20 for operating the rock-drill. Fig. 7 is an enlarged detail showing the manner of constructing the auger-flight. Figs. 8 and 9 are details showing the lock for the auger to the drill-rod. Figs. 10 and 11 are details showing the locking and releasing device for the 25 winding-drum of the rope for the auger. Fig. 12 is a detail showing the grip for the drill-rod, to which the lifting-rope is attached. Fig. 13 is a detail showing the device for locking 30 the drill-rod to the derrick. Fig. 14 is a detail in section, showing the head carrying the derrick and to which the power is applied. Fig. 15 is a detail, being a top or plan view of the device for operating the drill.

35 This invention has for its objects to improve well-boring machinery in respect to the means employed for giving the drill-rod a rotary motion and the means used for raising a dirt-carrying auger to clear the hole as fast 40 as bored, irrespective of the depth of the well or hole, and operating a rock-drill, and also to improve in this class of machines the several parts and their arrangement to produce the best results in use in reference to the 45 construction and operation of the machine as a whole; and its nature consists in the several parts and combination of parts hereinafter described, and pointed out in the claims as new.

50 In the drawings, A represents the front wheels, mounted on an axle A'.

B are the rear wheels, mounted on an axle B'.

C are the side pieces of the front section of the frame, connected at the front end by a cross-piece, and having secured near their inner ends a cross-piece C'. The side pieces C 55 rest upon a bolster connected to the axle A' by a king-bolt to allow the front wheels A to turn.

D are the side pieces of the rear section of 60 the frame, connected at their rear end by a cross-piece, and having secured to their inner ends a cross-piece D', from each end of which depends a bracket D².

E is an arch formed of four uprights, of angle-iron, each upright having at its lower end a base or leg portion E', with a flange which can be bolted to the respective side pieces C 65 D and complete the frame. The corner pieces or uprights of the arch E stand inclined, and at the upper end of each side a flange E² is 70 formed.

F is a cylinder having at its lower end a flange or rim F', through which and the flanges E² bolts a are passed for securing the 75 cylinder F firmly to the arch E.

G is an inner cylinder within the cylinder F and having at its upper end a rim or flange G', the periphery of which is formed with a 80 gear b.

H is an exterior cylinder surrounding the cylinder F between the flanges F' and G', and having at its lower end a flange H', the periphery of which is formed with a bevel-gear c. The cylinder F forms a bearing for 85 both of the cylinders G and H, and, as shown in Fig. 6, across the inner cylinder is a cross-piece G², having a central hole which forms a guide for and prevents wobbling of the drill-rod. 90

I is a sweep, the inner end of which is secured in a socket I' on a band I², which band encircles the cylinder H at its upper end and is firmly secured to the cylinder by a clamping-bolt, so that the movement of the sweep 95 will rotate the cylinder H. The socket I' has a second socket d, in which is a sliding latch e, the outer end of which is made to engage with the gear b and lock the sweep to the cylinder G for rotating such cylinder, and, as 100 shown, the latch e is connected by a rod e' with an L-shaped lever e², pivotally supported by ears e³ on the sweep I, so that the operator by moving the L-lever can lock the sweep

to or unlock it from the cylinder G, and, as shown, in order to support the sweep, brace-rods e^4 are provided running from the socket I' to the encircling bands I^2 on each side.

5 J are the corner posts or uprights of the derrick, the lower end of each post being firmly secured by bolts or otherwise to the inner cylinder G, and, as shown, the posts J are braced by cross-pieces J' , and to their
10 upper ends is secured a cap or top plate J^2 , having a central hole.

K is the drill-rod, the lower section of which at its lower end carries a drill-point K' , and at the lower end of the rod on opposite sides
15 is a flange or key i , firmly secured to the rod. A gripper or holder K^2 is mounted on the drill-rod above the auger, as shown in Fig. 1. This gripper is formed, as shown in Fig. 12,
20 of a disk or plate g , having an annular flange or ring g' and a plate or disk g^2 , which plate and the plate g have a central annular hole g^3 , and between the plates g and g^2 , inside of the flange g' , is a ring h , having a triangular
25 shape in cross-section to present a sharp edge for engagement with the drill-rod, and between the plates g and g^2 , outside of the ring g' , is a ring h' , having on one side an extension h^2 for the attachment of a rope or cable. This gripper or holder operates by lifting on
30 the extension h^2 , which forces the edge of the ring h into the drill-rod, the hole g^3 allowing sufficient play of the gripper for this purpose.

L is the tube or center of the auger, of an
35 interior diameter to fit around the drill-rod so as to slide thereon. The flight for the auger is formed of a first section L' , which is bolted to a bracket k , which bracket is bolted or riveted to the tube or center L, and the
40 balance of the flight is made up of sections L^2 , each section at its end, as shown, being partially cut away to form overlapping ends k' , which are secured together by bolts; but the ends may be secured together without be-
45 ing cut away. This manner of forming the flight enables the flight to be readily constructed in sections and the sections united one to the other so as to be firm around the center or tube and have the necessary strength
50 to withstand the strain in use, making as strong a flight as one made of a continuous strip without the expenditure of the time and labor required in making a flight from a continuous strip. At the top end of the flight is
55 another bracket similar to the bracket (not shown) which is bolted or riveted to the tube L, and to which the upper end of the flight is fastened.

On the center of tube L, above the flight,
60 is secured a support L^3 , formed by securing two rings j to the tube or center, with an intermediate ring j' between them, which ring has pivots j^2 on opposite sides, to which is pivoted the open end of a bail or yoke j^3 for
65 the attachment of a rope, by which the auger is raised and lowered.

M is a cross-head located between the posts

J, and having at each end a wheel or roller
M' to run between the posts, as shown in Fig. 13. This cross-head at its center is enlarged
70 and has a circular hole through which the drill-rod K can pass, and on one side of this cross-head in a recess f' is located a wedge f , having a tooth or serrated edge for engage-
75 ment with the drill-rod, and this wedge, as shown, is forced into engagement with the rod by set-bolts f^2 , and when locked against the rod the rod is locked to the cross-head, which is rotated by the derrick and the cylin-
80 der G.

N is a rope or cable, one end of which is attached to the gripper or holder K^2 , and the other end is attached to a winding-drum around which the rope is coiled.

O is the winding-drum, which has at one
85 end a disk or plate O' and at the other end a gear-wheel P' and is mounted on a shaft O^2 .

P is a gear-wheel meshing with the gear-wheel P' for turning the drum O.

Q is a shaft on which is secured the gear P.
90 This shaft at one end has secured thereto a crank or handle Q' , by which the shaft is turned, and the shaft is mounted in suitable boxes Q^2 on the side pieces C, and, as shown, the shaft O^2 is supported at the ends in the
95 base E' .

On the shaft Q, adjacent to the handle Q' , is a ratchet-wheel m , which is engaged by a spring ratchet or pawl m' , by which the shaft Q is locked against backward rotation except
100 when the pawl is released from engagement.

The rope N is attached to the extension h^2 of the gripper K^2 and passes up and over a pulley-wheel l , supported in a stirrup l' , sus-
105 pended from a shaft l^2 , running across the arch E at its upper end, and this rope, in connection with the drum O and its driving devices, operates to raise the drill-rod by drawing up on the gripper K^2 to force the ring h into
110 bite or engagement with the drill-rod, so as to elevate the rod by winding up the rope.

R is a rope or cable, one end of which is fastened to the bail j^3 of the support L^3 and the other end is attached to a drum on which the rope is wound.
115

S is the winding-drum for the rope R, which passes over a pulley n , mounted in a stirrup
120 n' , suspended from a rod n^2 , running across the arch E. The drum S has at one end a disk S' and at the opposite end a disk S^2 , and on this disk S^2 is formed or secured a ratchet or toothed wheel o , with which a sliding latch
125 o' , located between guides o^2 on the side piece D, can be made to engage, and, as shown, the sliding latch o' is thrown into or out of engagement by a lever p , supported on a stand-
130 ard p' by a suitable pin or pivot, so that by moving the lever the latch o' can be operated. The drum S can be stopped when the latch o' is out of engagement by the brake-block q ,
carried by the lever q' , which lever is locked by a sliding latch with a rack q^2 . This brake-
block q can be forced against the rim of the disk S^2 with sufficient force to stop the rota-

tion of the drum, or its pressure can be such as to grade the speed at which the drum runs when released from its driving-clutch.

T is the shaft on which the drum S is mounted, so as to run free and have an endwise movement for engagement with its driving-clutch, one section of which is carried by a sleeve T' on the shaft T. The drum S is moved endwise by a rock-shaft r , having an arm or lever r' and mounted in boxes r^2 on the side piece D of the frame, and this shaft r has a short arm s , to which is connected one end of a rod s' , the other end of which is connected to a ring, as usual, located in a groove in the hub of the disk S^2 , by which means the reel is free to turn on the shaft T, and at the same time can be moved inward to cause the clutch-section t on the disk S' to engage with the clutch-section t' on the collar T' to cause the clutch to drive the reel in the direction to wind the rope R thereon, and by moving the reel backward the clutch-sections $t t'$ will be disengaged, allowing the reel to run backward loosely and unwind the rope therefrom, and the speed of the reel in unwinding can be regulated by the brake-block q , or by this brake-block the unwinding can be stopped. The sleeve T', with its clutch-section t' , is driven by a bevel-gear t^2 on the collar T', which meshes with a bevel-gear u^2 on a rod u , which rod runs up at one corner of the arch and at its upper end is supported in a box u^3 , attached to the arch, and to the upper end of the rod or shaft u is secured a bevel-gear u' , which meshes with the bevel-gear c on the flange H' of the cylinder H, so that the rotation of the cylinder will, through the gears c and u' , rotate the rod u .

U is a wheel or disk having on its periphery a series of projections U' and mounted on a shaft U², journaled at its ends in the brackets D².

V are bars attached to the axle B' by bolts or otherwise and located to have one bar on each side of the wheel or disk U, and each bar at its outer end has a head V', on which is an incline v^3 . Each bar V, at the point where the shaft U² passes, is provided with an ear v , adjacent to which on the shaft is a collar v' , which is locked to the shaft by a set-screw or bolt v^2 , by which means the bars are locked against side movement or spring.

W are bars, one on each side of the wheel U, and pivotally connected to the hub of the wheel or to the shaft U² between the wheel and the ear v . Each bar has a slit w , in which is located the end of a pin or pivot w' , to which is secured a sliding stop W', which stop is of greater width than the space between the bars W, allowing the edges w^2 to rest on top of the bars. At each end of the pin or pivot w' is mounted an anti-friction roller w^3 , which runs on the incline v^3 as the bars W are forced down by the engagement of the sliding stop W' with a projection U', which engagement is had by the rotation of the wheel U, which carries the projections U'

around successively to engage with the stop W' when the bars W are elevated, as shown in Fig. 3, and cause such engagement to carry the bars down with the continued rotation of the wheel U, as shown in Fig. 4. The stop W' is drawn back and released from engagement with the projection or cam U' by the travel of the anti-friction rollers w^3 down the inclines v^3 of the heads V', and as soon as the stop is released from engagement the bars W are elevated by the weight of the drill, and in being elevated the stop is returned as soon as released by the action of a push-spring w^4 , secured to the bars W and the stop W', as shown in Fig. 6, and such return brings the stop in position to be engaged by the next succeeding projection U', and this forward-and-back movement of the stop is permitted by the slot w .

X is a walking-beam pivotally attached at its inner end to a bracket C² on the cross-piece C' and connected at its free end with the free end of the bars W by a link x , and this walking-beam has a pulley y connected therewith by a stirrup or hanger y' .

Y is a pulley mounted between ears or brackets Y' on the cap or top plate J², and over which a rope R runs when the machine is used for operating a rock-drill, and when operating a rock-drill the parts U, V, W, and X and the devices connected therewith are brought into play; but when operating an auger these parts are thrown out of use and a drill-rod with an auger thereon is substituted, as shown in Fig. 1, Fig. 6 showing the drill-operating devices.

Z is a drive-chain running over a sprocket-wheel z on the end of the shaft T and a sprocket-wheel z' on the end of the shaft U², and by which the shaft U² is driven from the shaft T to drive the wheel U.

The machine for use with a drill and auger is arranged as shown in Fig. 1, in which arrangement the auger is slid onto the drill-rod K and the drill-rod passed up through the arch and cylinders and guide or cross head M to the top of the derrick, successive sections of the drill-rod being added as the drill descends. The auger is locked to the drill-rod to be rotated therewith by the engagement of the keys i with the slots or recesses i' in the tube L, and the rotation of the drill-rod and auger is had by the rotation of the derrick K and cross-head M from the cylinder G, as already described. The auger when full is raised by means of the rope R, which rope is wound onto the drum S by throwing the drum into engagement with the collar T', and when the auger is raised above the surface it is unloaded and the drum released from its clutch, allowing the rope to unwind and the auger to descend on the drill-rod K to be again operated, filled, and raised, and these movements will continue until the hole is finished, or until a rock stratum or other hard material which requires the employment of a rock-drill is reached. The drill-rod descends by

gravity, and when required to be raised the gripper K^2 is made to bite onto the rod by drawing on the rope N , and the rope is then wound onto the drum O by turning the shaft Q through the crank Q' , which, through the gear-wheels P and P' , drives the drum to wind the rope thereon.

The machine for use with a rock-drill is arranged as shown in Fig. 3, and when so arranged the drill-rod K , with its auger, is removed and the rope R is attached to the eye of the rod of the rock-drill, and thence runs up through the cylinders and derrick and over the pulley and down under the pulley y across to the drum S , and the walking-beam X is connected with the trip mechanism by a link x and bars W . The bars W are thrown down by the action of the wheel U , as already described, and such downward movement of the bars W will carry down the walking-beam X , drawing the rope R up and raising the drill, and the drill will be raised until the stop W' is released from its engagement, which allows the bars W and walking-beam to rise and the drill to drop and perform its work. The drum S is left unclutched and is locked in position by the latch o' , and when more rope

is required the latch is released, allowing the rope to unwind, and in unwinding the brake-block q can be brought into use to regulate the speed or stop the unwinding, and when it is desired to raise the drill out of the ground or to a greater distance than the action of the walking-beam would raise it the drum-clutch is brought into engagement and the rope R wound onto the drum to the extent required.

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

1. The combination of a rotating disk or wheel provided with projections with bars W , a sliding spring-catch mounted on said bars, inclines v^3 , and a walking-beam connected with the rope of a drill-rod, substantially as and for the purpose specified.

2. The wheel U , having projections U' , bars W , having inclines v^3 , and sliding stop W' , having a spring w , in combination with a walking-beam X , rope R , and pulleys Y y , substantially as and for the purpose specified.

JOHN W. TEETZEL.

Witnesses:

JAMES GENTLEMAN,
SAML. RICHOLSON.