

No. 621,408.

Patented Mar. 21, 1899.

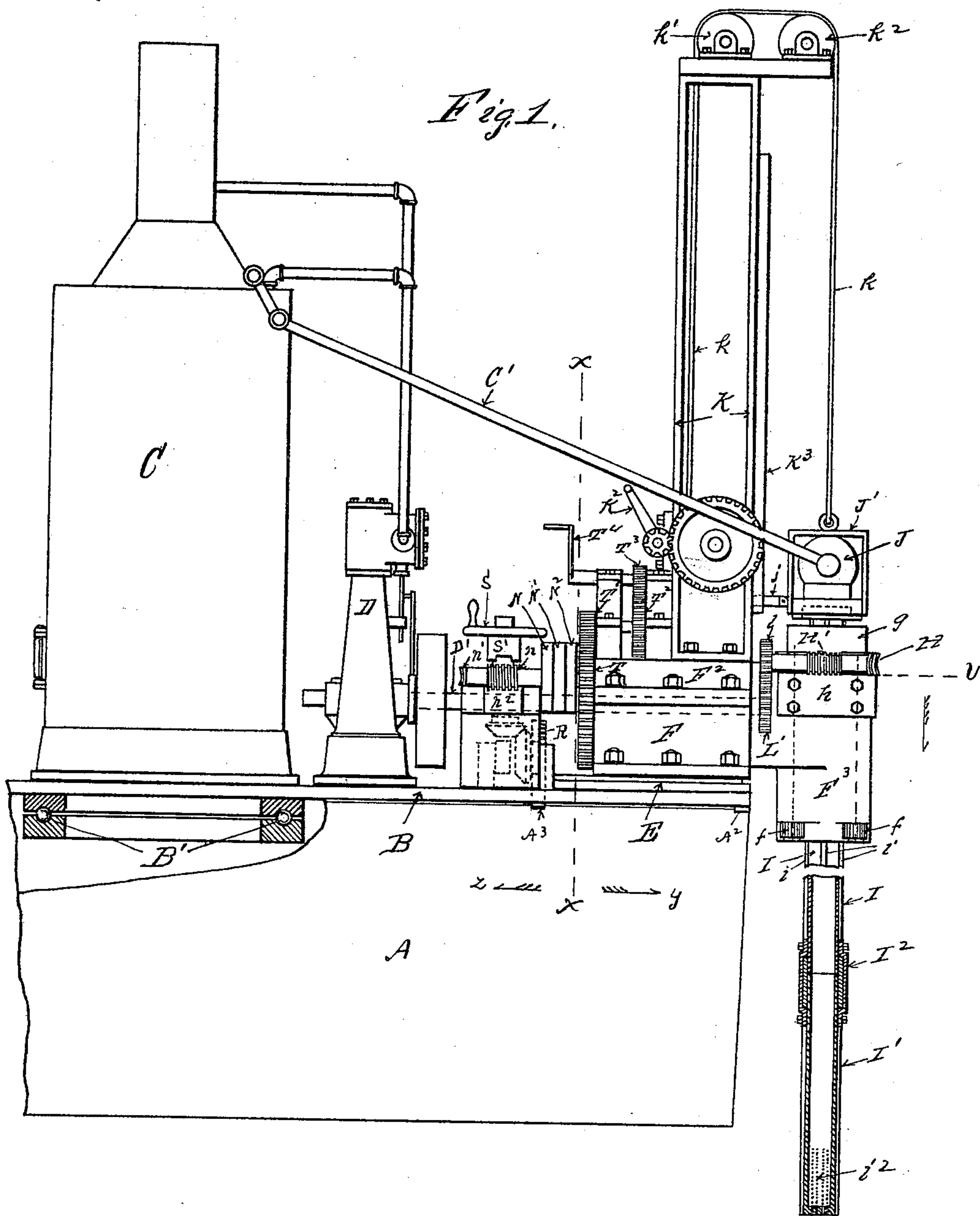
H. M. GUILD.

HYDRAULIC DREDGING MACHINE.

(Application filed Apr. 4, 1898.)

(No Model.)

4 Sheets—Sheet 1.



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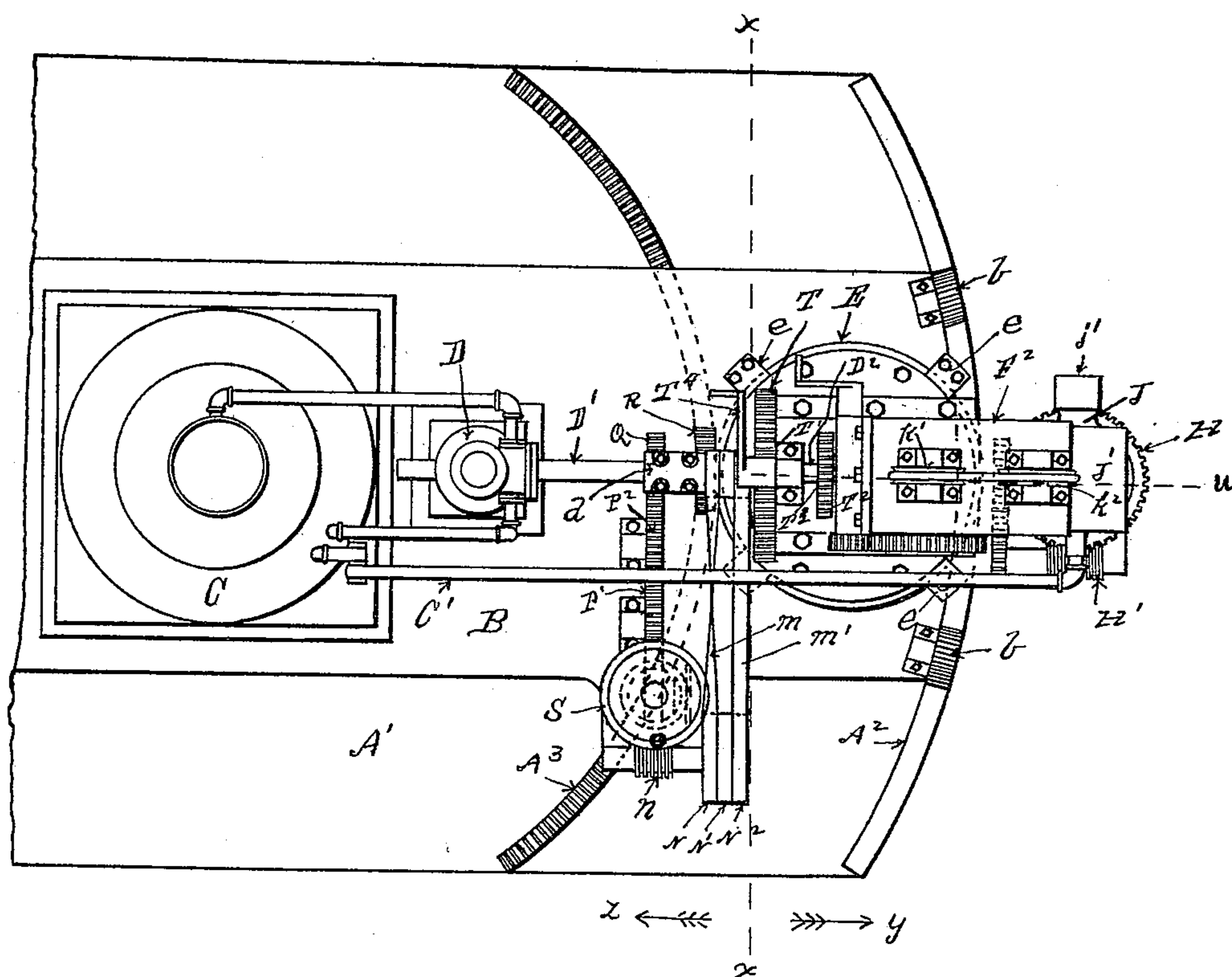
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Fig. 2.



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Fig. 3.

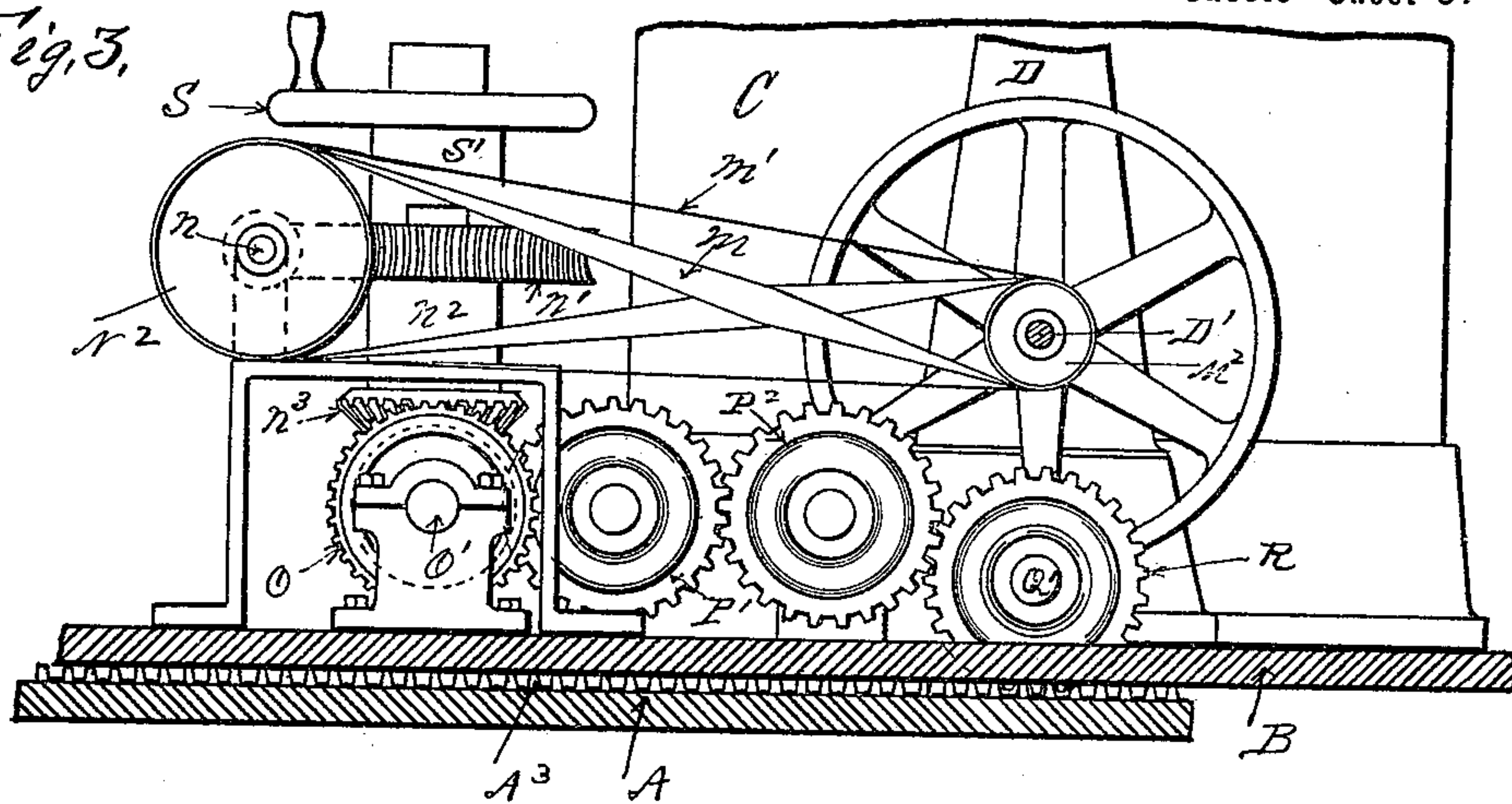
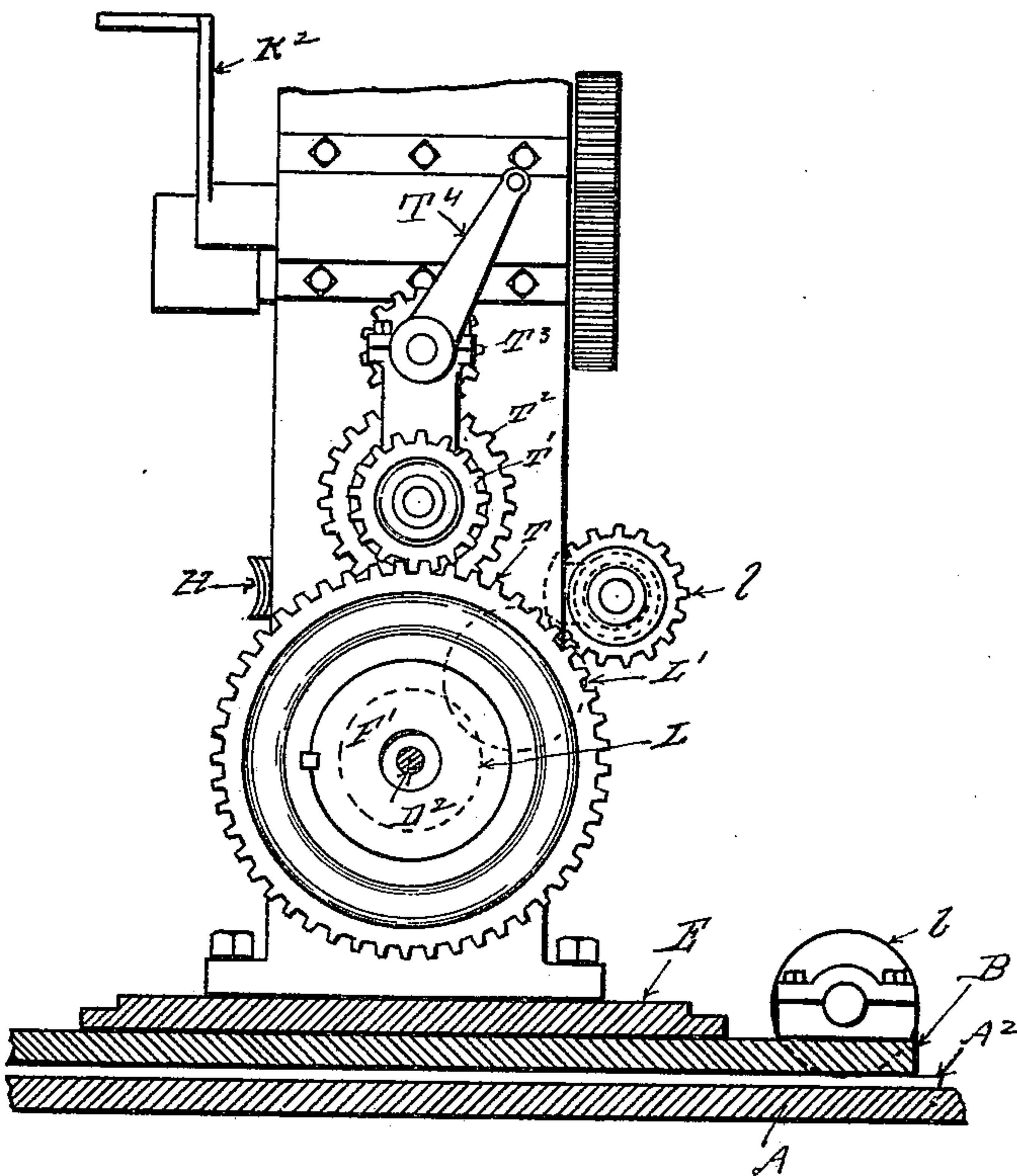


Fig. 4.



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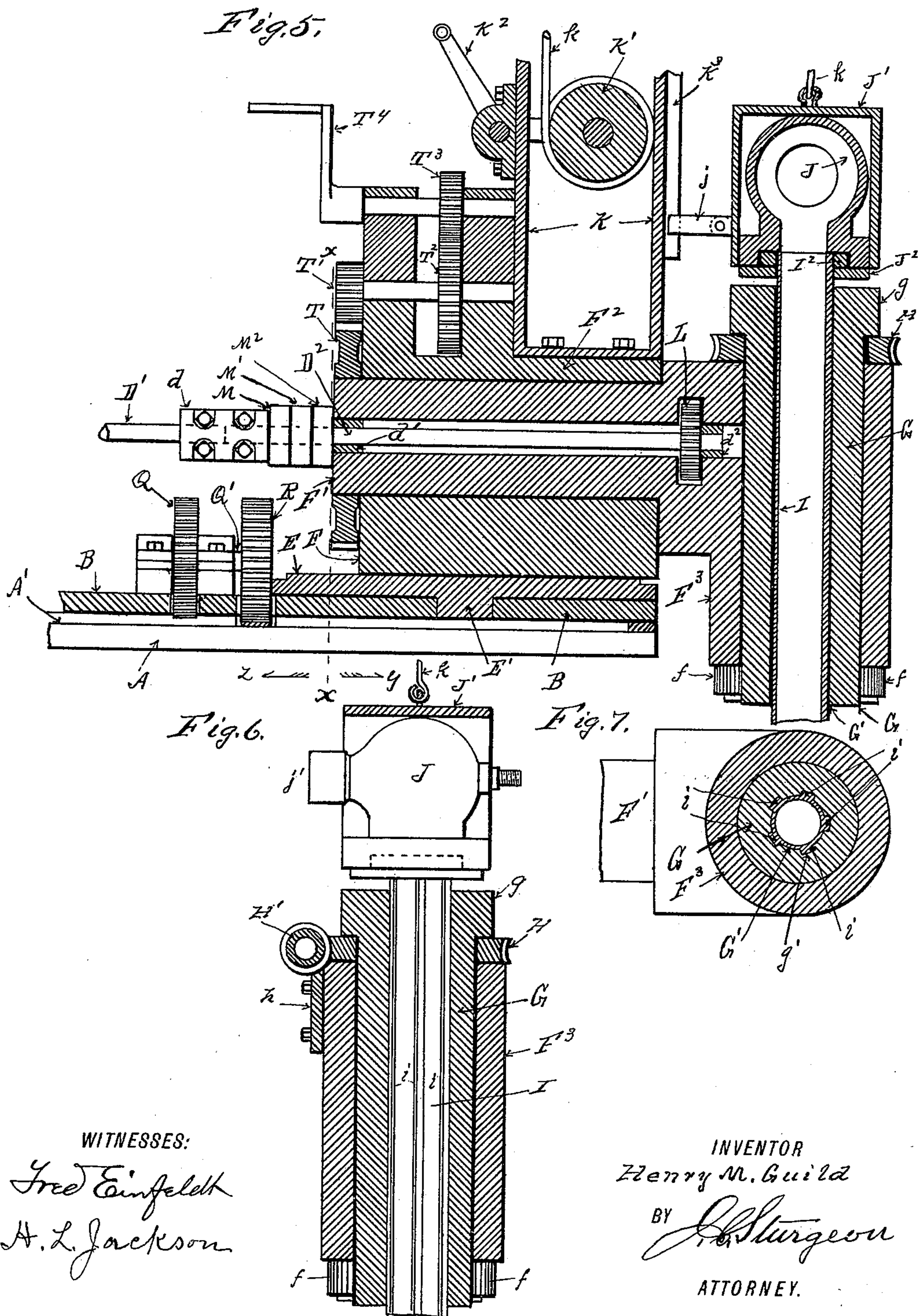
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HENRY M. GUILD, OF ERIE, PENNSYLVANIA.

HYDRAULIC DREDGING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 621,408, dated March 21, 1899.

Application filed April 4, 1898. Serial No. 676,351. (No model.)

To all whom it may concern:

Be it known that I, HENRY M. GUILD, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Hydraulic Dredging-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

This invention relates to improvements in hydraulic dredging-machines; and it consists in the improvements hereinafter set forth and explained, and illustrated in the accompanying drawings, in which—

Figure 1 is a side view in elevation, showing a section of a boat and my improved hydraulic dredging-machine thereon. Fig. 2 is a top or plan view of the same. Fig. 3 is a transverse vertical section of a portion of the machine on the line *xx* in Figs. 1, 2, and 5, looking in the direction of the arrow *z*. Fig. 4 is a transverse vertical section of the same on the line *xx* in Figs. 1, 2, and 5, looking in the direction of the arrow *y*. Fig. 5 is a longitudinal vertical section of a portion of the same on the line *w* in Fig. 2. Fig. 6 is a vertical section of the suction-tube mechanism and its supporting-sleeve. Fig. 7 is a transverse section of the same on the line *v* in Fig. 1, looking downward.

In the drawings illustrating my invention, A is a section of a suitable boat, upon the deck A' of which is mounted a bed-plate B, pivoted at its inner end, preferably upon a ball-bearing support B', so that it will swing freely thereon, the outer end of the bed-plate B being supported by rollers *b b*, traveling on a curved track B² on the end of the deck A'.

Upon the inner end of the bed-plate B there is mounted a boiler C and adjacent thereto an engine D, the main shaft of which extends outward toward the end of the bed-plate B and consists of two sections D' and D², secured together by means of a clamp-coupling *d*, as

and for the purpose hereinafter set forth. Centrally mounted on the outer end of the bed-plate B there is a turn-table E, having a

central pivot E', (see Fig. 5,) and over the edges of this turn-table E there are removable guides *e*, bolted to the bed-plate B, so as to prevent the turn-table E from tipping, but permitting it to rotate freely on the central stud E'. In a cylindrical bearing between a pillow-block F, secured to the turn-table E, and a cap-plate F², secured to the top of said pillow-block, there is mounted a hollow trunnion F', the central opening in which is in line with the main engine-shaft D' D² and in which opening there are bearings *d'* *d*² for the shaft-section D².

Upon the outer end of the trunnion F', beyond the end of the boat-deck A', there is a vertical sleeve F³, in the lower end of which there are friction-rolls *f*. Within this sleeve F³ there is a vertical sleeve G, which rotates freely therein, the friction-rolls *f* operating on the lower end thereof to relieve the friction caused by lateral strain thereon. The upper end of the sleeve G is provided with a collar *g*, between which and the upper end of the sleeve F³ there is a worm-wheel H, keyed to the sleeve G for the purpose of rotating it within the sleeve F³, and in the central opening G' of the sleeve G there are radial grooves *g'*, adapted to receive radial ribs *i* on a tube I, adapted to slide up and down in the opening G'. This tube I extends downward through the sleeve G and is adapted to be raised and lowered therein, as hereinafter set forth.

Upon the lower end of the tube I there is secured another tube I' by means of a sleeve-joint I². This tube I' is also provided with radial ribs *i* and with a closed lower end *i'*, but the end *i'* and the sides of the lower portion of the tube I' are perforated with small openings *i*², which operate to strain the material passing into the tube I'. On the top of tube I and communicating therewith there is an ordinary siphon-pump J, secured to the top of the tube I by means of a collar I² on the top of the tube I, fitting into a recess in the bottom of the pump J and being secured therein by a collar J², secured to the bottom of the pump, so that the tube I and collar I² thereon will rotate freely therein. Steam from the boiler C being supplied to the siphon-pump J through a flexible jointed pipe C', it operates to suck up water and other material entering the lower part of the tube I'

through the openings i^2 and discharge them through suitable conveyers (not shown) attached to the discharge-opening j of the siphon-pump. In lieu of the siphon-pump shown an ordinary rotary pump could be used for the same purpose, though I prefer the construction shown and described.

To the top of the bearing F^2 , I secure an upright frame K , provided with a back-gear drum K' , adapted to be operated by a crank K^2 , from which drum a suitable rope or chain k passes up over rollers k' k^2 in the top of the frame K and is secured to a box or frame J' , surrounding the pump J , secured to the top of the tube I , whereby the tubes I and I' and the pump J can be raised and lowered as desired. To keep the tubes I and I' vertical, there is a vertically-swinging latch j' on the box J' , surrounding the pump J , which engages a vertical groove K^3 in the upright frame K and which moves up and down therein when the pump J and the tubes I I' are being raised or lowered.

For rotating the sleeve G and the tube I therein a worm H' , mounted in bearings h on the side of the top of the sleeve F^3 , intermeshes with the worm-wheel H , the worm H' being driven by a gear-wheel L on the end of the engine-shaft D' D^2 , which intermeshes with an intermediate L' , which intermeshes with a gear l on the end of the worm H' , as shown in Fig. 1 and in dotted lines in Figs. 2 and 4. For swinging the outer end of the bed-plate B around on the track A^2 there are three pulleys M M' M^2 on the main shaft D' D^2 , (see Fig. 5,) the outer pulleys M and M^2 being loose and the pulley M' tight upon the shaft, and upon these pulleys are two belts m and m' , leading to three like pulleys N N' N^2 on a worm-shaft n . One of these belts, m , is a cross-belt, and it is obvious that either the cross-belt m can be used on the tight pulleys M' N' to drive the worm n in one direction or the straight belt m' can be used thereon to drive the worm n in the opposite direction. This worm n intermeshes with a worm-wheel n' on a vertical shaft n^2 . This shaft n^2 has on its lower end a bevel-gear n^3 , which intermeshes with a bevel-gear O on a shaft O' , upon which a gear-wheel P intermeshes with a train of gears P' P^2 , engaging a gear-wheel Q on a shaft Q' , upon which there is a gear-wheel R , which intermeshes with a curved rack A^3 on the deck A' of the boat A , by means of which mechanism the outer end of the bed-plate B , with the mechanism thereon, can be swung back and forth on the track A^2 for the purpose of moving the suction-pipes I I' back and forth across the end of the boat. For the purpose of moving the bed-plate B back and forth by hand when the belts m and m' are on the loose pulleys M N and M^2 N^2 , I have provided a hand-wheel S , adapted to engage with the upper end of the shaft n^2 by means of a clutch S' , whereby the train of gears driving the gear-wheel R in the rack A^3 can be operated when desired.

For the purpose of raising the tubes I and I' upon the deck A of the boat I have provided a gear-wheel T on the inner end of the trunnion F' , which intermeshes with a train of gears T' T^2 T^3 , connecting with a crank T^4 , whereby the trunnion F' , the sleeve F^3 , and the mechanism mounted thereon can be turned up into a horizontal position. In doing this the coupling d , joining the engine-shaft sections D' D^2 , is first uncoupled and the belts m and m' removed from their pulleys and the latch j' out of the groove K^3 . Then the trunnion is rotated, as hereinbefore described, and the turn-table E , upon which it is mounted, is rotated to the point desired.

In operating my machine the tubes I I' are let down into the sandy material to be dredged, and during the rotation thereof by means of the mechanism hereinbefore described the vertical ribs i on the tubes operate as agitators to loosen up the material to be dredged, which is sucked up by the pump through the holes i^2 in the lower portion of the tube I' , the mechanism meanwhile being swung back and forth across the end of the boat by means of the mechanism described, so as to cover as great a width of ground as the travel of the bed-plate B on the track A^2 will permit.

Having thus fully described my invention, so as to enable others skilled in the art to which it appertains to construct and operate the same, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination in a hydraulic dredging-machine, of a bed-plate mounted and capable of swinging back and forth on the deck of a boat, a turn-table mounted on said bed-plate, a trunnion mounted on said turn-table, suction-tube supporting and rotating mechanism on said trunnion, and mechanism for rotating said suction-tube, substantially as and for the purpose set forth.

2. The combination in a hydraulic dredging-machine, of a bed-plate pivoted at one end on the deck of a boat, tracks on which the free end of said bed-plate travel back and forth, an engine and boiler mounted on said bed-plate, rack-and-gear mechanism for moving the free end of the bed-plate back and forth, a turn-table mounted on the outer end of the bed-plate, a hollow trunnion mounted on said turn-table, sleeve mechanism mounted on the outer end of said trunnion and adapted to be rotated, a vertically-moving tube supported in and rotated by said sleeve mechanism, a pump mechanism communicating with the upper end of said tube, worm and spur gear mechanism for rotating the sleeve and tube therein, and ribs on the periphery of the tube, substantially as and for the purpose set forth.

3. The combination in a hydraulic dredging-machine, of a trunnion, a sleeve on the end of said trunnion, an inner sleeve rotating within the sleeve on the trunnion, worm and spur gear for rotating said inner sleeve,

longitudinal grooves in the inside of the rotating sleeve, a suction-tube having longitudinal ribs thereon adapted to engage the grooves in said sleeve, and mechanism for raising and lowering said tube in said sleeve, substantially as and for the purpose set forth.

4. In a hydraulic dredging-machine, a suction-tube, longitudinal ribs projecting radially from said tube, sleeve and gear mechanism for supporting and rotating said tube, suction-pump mechanism communicating with the top of the tube, and mechanism for raising and lowering the tube, substantially as and for the purpose set forth.

5. In a hydraulic dredging-machine, a turntable, a hollow trunnion mounted on said turntable, a sleeve on the outer end of said trun-

nion, gear-and-crank mechanism engaging the inner end of said trunnion for rotating it, an inner sleeve mounted within the sleeve on the outer end of the trunnion, a suction-tube passing down through said inner sleeve, and adapted to rotate therewith, a shaft through said hollow trunnion, and gear-and-worm mechanism connecting said shaft with said inner sleeve for rotating it, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY M. GUILD.

Witnesses:

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H. J. CURTZE.