

No. 719,766.

PATENTED FEB. 3, 1903.

W. H. DOWNING.

MACHINE FOR SCREWING OR UNSCREWING WELL CASING SECTIONS.

APPLICATION FILED NOV. 29, 1902.

NO MODEL.

2 SHEETS-SHEET 1.

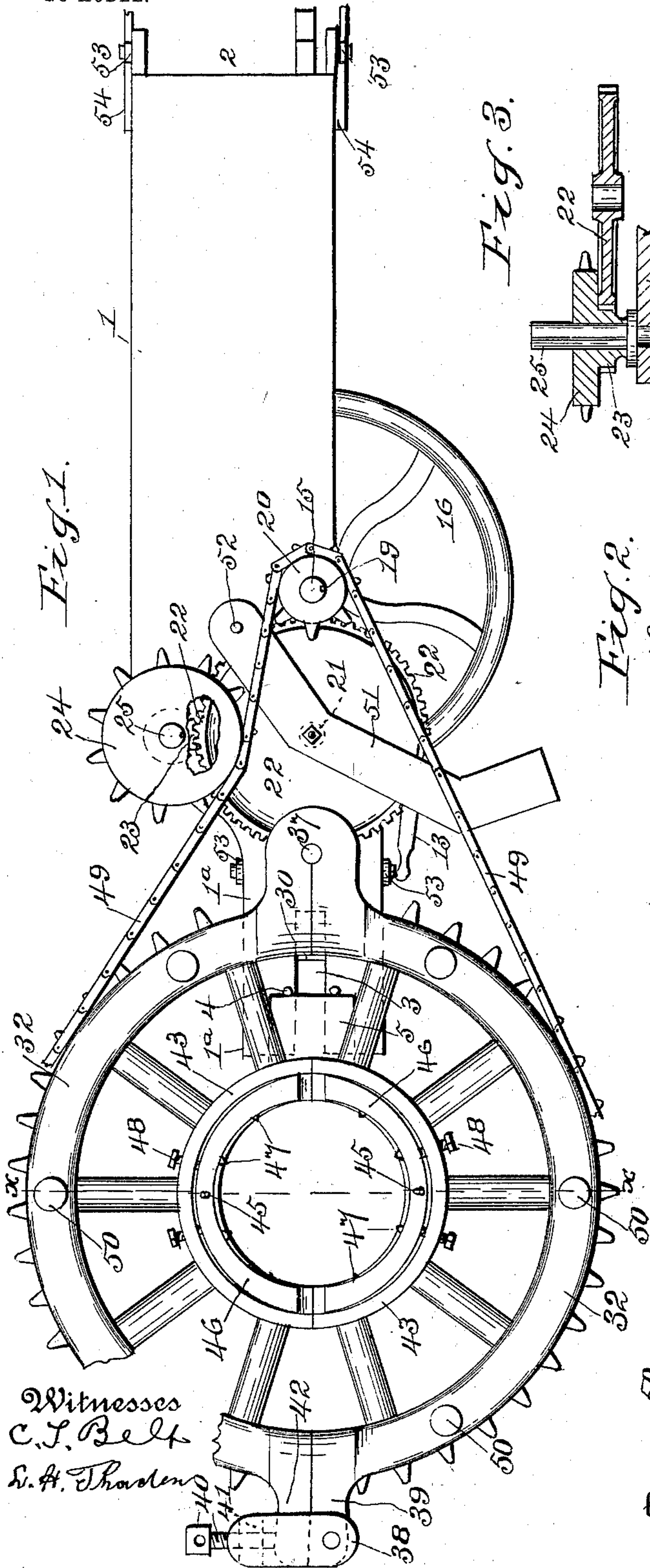


Fig. 3.

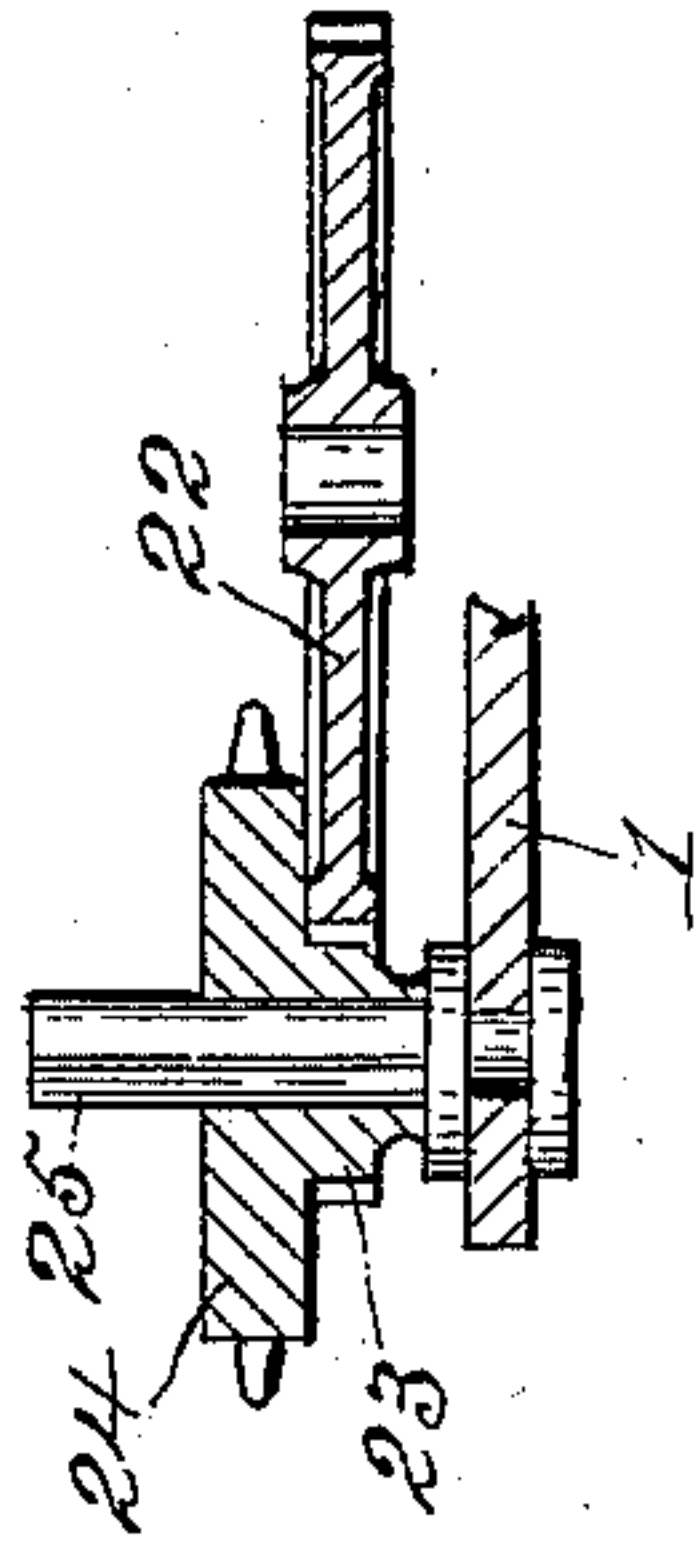
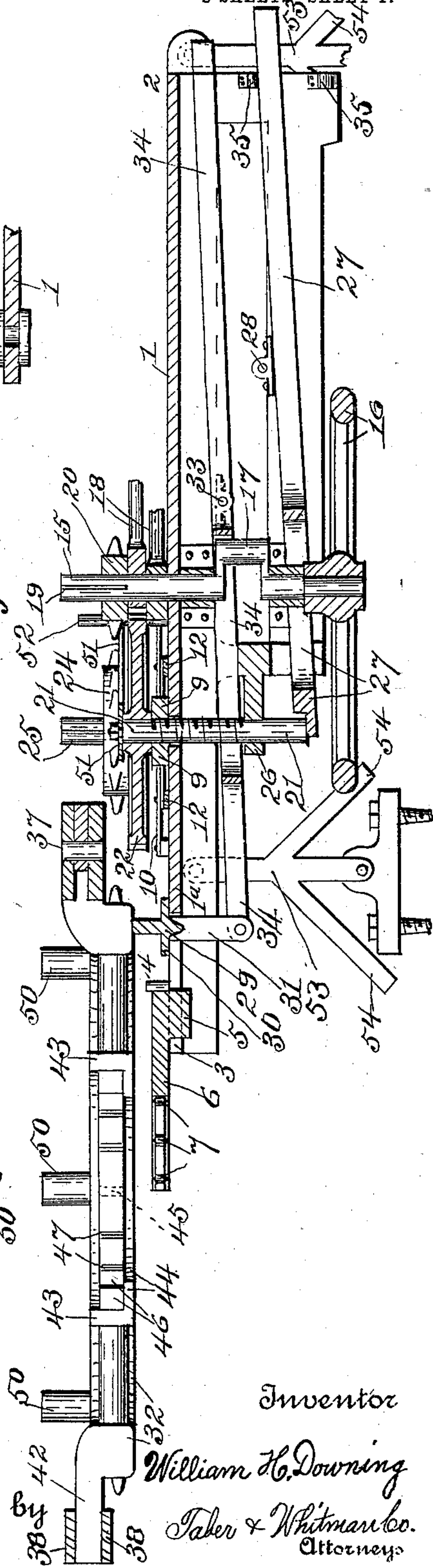


Fig. 2.



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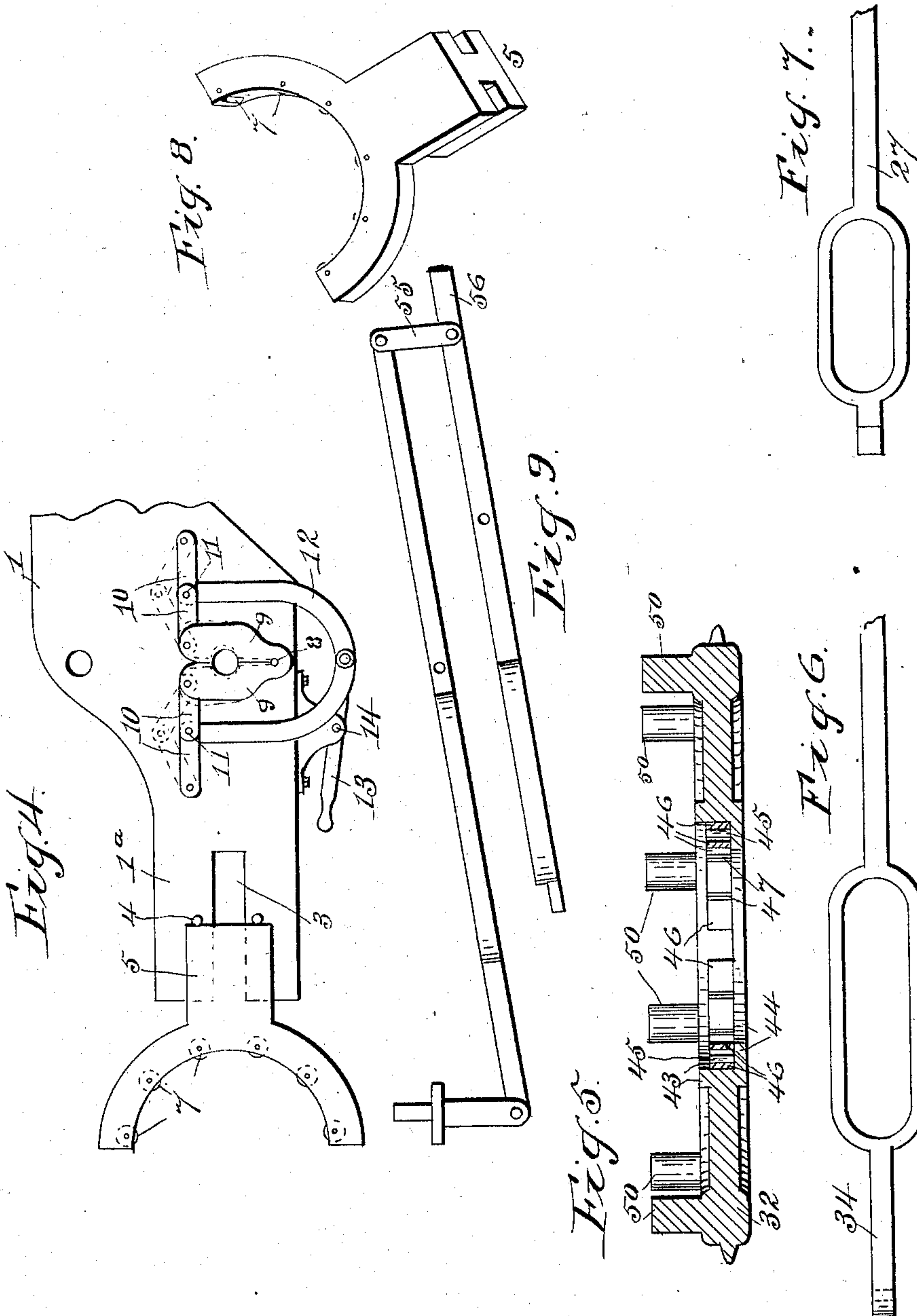
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2 SHEETS—SHEET 2.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM H. DOWNING, OF PARKERSBURG, WEST VIRGINIA.

MACHINE FOR SCREWING OR UNSCREWING WELL-CASING SECTIONS.

SPECIFICATION forming part of Letters Patent No. 719,766, dated February 3, 1903.

Application filed November 29, 1902. Serial No. 133,189. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. DOWNING, a citizen of the United States, residing at Parkersburg, in the county of Wood and State of West Virginia, have invented certain new and useful Improvements in Machines for Screwing or Unscrewing Well-Casing Sections; 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.

This invention pertains to the class of well boring and drilling, and relates particularly to a machine for screwing and unscrewing the well-casing section in placing and removing such section.

The object of the invention is to provide a machine to screw and unscrew sections of well-casings in placing and removing the latter of such peculiar construction and arrangement of parts that the pipe or casing sections are screwed or unscrewed, as occasion may demand, by the automatic operation of the machine.

A further object of the invention is to provide special detail parts of novel and peculiar construction, consisting, essentially, of a split sprocket-wheel to clamp the casing, a slidable screw-shaft having a gear fixed thereon, a shaft having a pinion and a sprocket slidable thereon, a slidable sprocket on the driving-shaft, and levers to operate the said slidable shaft and the split wheel.

A still further object of the invention is to provide a slidable shaft having a screw-thread similar to the thread of the well-casing sections and driven by a pinion and gear through a chain of sprocket-wheels, one of said wheels being the pipe or casing clamping-wheel, so as to automatically raise and lower the other two of said wheels simultaneously with a like action of the clamping-wheel and the section of casing clamped by said wheel.

Various other objects, advantages, and improved results are attained in the practical application of the machine, which will be hereinafter disclosed, and pointed out in the claims to follow.

In the accompanying drawings, forming part of this application, Figure 1 is a plan view. Fig. 2 is a central longitudinal section.

Fig. 3 is a detail section of gear-wheels and one of the sprocket-wheels. Fig. 4 is a detail elevation of part of the bed-plate, showing centering device and shaft-clamping nut. Fig. 5 is a sectional view of the clamping sprocket-wheel on the line *xx*, Fig. 1. Figs. 6 and 7 are top views of the foot-levers. Fig. 8 is a perspective view of a center set. Fig. 9 shows modification of foot-levers.

The same numeral references denote the same parts throughout the several views of the drawings.

The bed-plate 1 may be of any desired shape or form; but I prefer to make it, as shown in the drawings, with the head 1^a thereof offset from the end 2, to which an ordinary reversible engine is attached, the latter not being herein shown and described, inasmuch as it forms no part of the invention except to drive the machine. The head 1^a has a slot 3 and is provided with one or more stop-pins 4, against which a T-shaped block 5 of a center set 6 abuts, and the block works in said slot. I provide three or more center sets 6, of graduated sizes to fit various-size casing, and the wings of the sets are provided with roller-bearings 7, which engage a casing-section after the latter has been placed in position to be screwed to a prior-placed section in the well, and when the said engagement has been made the bed-plate is fixed in position for the machine to operate on the casing. This manner of setting the machine centers it with the well regardless of the size of the casing employed.

On the head 1^a is pivoted at 8 a clamping-nut 9, having its free ends pivoted to toggle-levers 10, which are pivoted together and to the ends (at 11) of a U-shaped lever 12, having a hand-lever 13, fulcrumed at 14 and pivoted to the U-shaped lever. It is obvious that by working the hand-lever the clamping-nut is opened and closed, the purpose of which will be hereinafter fully described.

The main or driving shaft 15 is journaled in the bed-plate and has a suitable fly-wheel 16, crank 17, and eccentrics 18. The projecting end of the shaft 15 is provided with a key 19 and has a sprocket pinion-wheel 20 slidably held thereon by said key to revolve with said shaft. A shaft 21, having a screw-thread like or similar to the thread on well-casing

sections, is slidably secured in the bed-plate 1, has a gear-wheel 22 keyed thereto, and screws through the clamping-nut 9. The gear 22 meshes with a pinion 23 on a sprocket-wheel 24, slidably keyed to a shaft 25, so as to turn therewith. The sprockets 20 and 24 overlap the wheel 22, so that the latter will carry the former according to the screw movement of the shaft 21 in the clamping-nut 9. The shaft 21 extends through a guide-bracket 26 and is engaged by a lift-lever 27, fulcrumed at 28 and operated to lift said shaft, (after the clamping-nut is opened,) its gears, and the pinions, the purpose of such lifting to be hereinafter disclosed.

A rest 29, having flanges 30 to engage the bed-plate, and an arm 31, extending through the bed-plate, is provided to raise the sprocket split ring or wheel 32, the details of which are to be later treated herein. Pivoted to the arm 31 and fulcrumed at 33 is a lift-lever 34, which, like the lift-lever 27, may be held down by suitable catches 35.

The split ring or wheel 32 is hinged at 37, has a keeper consisting of arms 38 pivoted in an ear 39 of one of the wheel-sections and a set-bolt 40 screwing through a lug 41 of the arms and engaging an ear 42 of the other wheel-section. The hub of the wheel 32 has a top rim 43 and an under flange 44, provided with one or more pins 45 to hold clamping-segments 46 on said flange. The inner edge of the segments have gripping-points 47, and the segments may be made to grip the well-casing, should the closing of the wheel 32 thereon not be sufficient, by suitable set-screws 48, extending through rim 43. The wheel 32 has sprocket-teeth throughout its periphery for a sprocket-chain 49, which is operated by the sprocket-wheel 20, and the chain meshes with the sprocket-wheel 24 to operate the pinion and gear and revolve the screw-shaft 21. The wheel 32 is provided with projections or ports 50 for the purpose of assisting the wheel in starting to turn the casing should the thread of the latter become jammed in unscrewing or should a closer joint than the machine makes be desired in screwing up the casing-sections. Suitable levers are inserted between the projections or posts and operated by hand to effect such turn of the wheel when necessary. A support 51 for the sprocket-chain is secured on top of the shaft 21 and is slid by the latter on a guide 52 to carry the chain. The bed-plate is supported by pivoted links 53, having brace-legs 54, so that the bed may be swung to and from the well in fixing the machine in operative position. As shown in Fig. 7, the foot-levers are connected by a link 55 and only one of them has a foot-piece 56.

A casing-section being placed in position to be screwed into or out of a section fixed in the well, and, for example, the operation will be described under the first screw action, the machine, with suitable-size set, is moved

into position to have the set hug such placed section and abut against stop-pins 4. The machine being fixed stationary in this position, the split wheel is brought around said placed section on the rest 29. The clamping-nut 9 being open, the lever 27 is operated to lift the shaft 21 and its gear, and hence the sprocket-wheels, and simultaneously there-with the split wheel is lifted by operating the lever 34. While in such raised position the split wheel is clamped, and, if necessary, the clamping-segments may be adjusted to more firmly grip the casing. The sprocket-chain is then put in place and the clamping-nut 9 closed about the shaft 21 to hold the latter in such raised position, whereupon the levers 27 and 34 are released, which permits the split wheel rest to drop to the bed-plate, leaving the split wheel and the sprocket-wheel in true alinement and leaving sufficient clearance or space between said rest and the split wheel for the downward movement of the latter in screwing the casing-section down. Then motion being imparted to the main or driving shaft from the machine-engine or other suitable driving-power connections, the split sprocket or clamping wheel turns the casing and screws it into position. It will be understood that said clearance is sufficient to effect said screwing down or coupling of the casing-sections, and when accomplished the split wheel is unclamped and the clamping-nut opened to permit a repeated operation of the levers 27 and 34, as above described. In unscrewing casing-sections the engine is simply reversed.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for screwing and unscrewing well-casing sections the combination, with suitable driving-power, and a sprocket-wheel slidably on the power-shaft, of a split sprocket clamping-wheel, a screw-shaft having a gear-wheel, a clamping-nut for the screw-shaft, a vertically-slidable sprocket-wheel having a pinion meshing with said gear-wheel, and a sprocket-chain to operate the sprocket-wheels.

2. In a machine of the character described, the combination, with a driving-shaft, a screw-shaft, and a clamping-nut for the screw-shaft, of the gear and pinion, a train of sprocket-wheels one of which constitutes a clamping-wheel, and a sprocket-chain operating the gear and sprocket wheels from the driving-shaft.

3. The combination, with a driving-shaft, a sprocket-wheel turned by and slidably on the shaft, a screw-shaft having a gear-wheel, and the sprocket-wheel having a pinion and slidably on a revolving shaft, of a lever to lift the screw-shaft and its gear to have the latter raise the sprocket-wheels, and a nut to clamp and hold the screw-shaft in raised position.

4. A wheel for clamping and turning well-casing sections, comprising members hinged

together so as to divide or split the wheel, sprockets upon the periphery of the wheel, adjustable gripping-segments in the wheel-hub, and a tie or fastening pivoted to one member of the wheel and having a set-screw adapted to engage the other wheel member.

5 5. The combination, with the bed-plate having a slot and stop-pins, of a center set comprising a block slidable in the slot against said pins, wings diverging from the block, and roller-bearings journaled in the wings.

10 6. The combination, with a hinged clamping-nut, of the toggle-levers, the fulcrumed hand-lever, and the lever to which the toggle and hand levers are pivoted.

15 7. The combination, with the split wheel, and a rest for the wheel having a depending arm, of a fulcrumed lever pivoted to the arm and operated to raise the wheel.

20 8. The combination, with the split wheel, the screw-shaft having a gear, the sprocket-wheels overlapping the gear-wheel, a pinion on one of said sprocket-wheels meshing with the gear-wheel, and means to simultaneously raise in alinement the screw-shaft, sprocket-wheels, gear and split wheel.

9. In a machine for screwing and unscrewing well-casing sections the combination, with a split sprocket-wheel to clamp said sections, a shaft having a screw of the same character as the screw of the sections, and a clamping-nut for the screw-shaft, of the gear, pinion, sprocket-wheels and chain for turning the split wheel and the screw-shaft simultaneously.

35 10. The combination, with the screw-shaft having a gear-wheel, and a sprocket-chain working over said wheel, of a rest or support for the chain secured to the top of said shaft and positioned between the gear and the chain.

11. The combination, with the bed-plate, of the links pivoted at one end to an anchor, and at the other end to the bed-plate so as to permit the latter to be swung horizontally.

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

WILLIAM H. DOWNING.

Witnesses:

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LUCIEN H. THASTEN.