

No. 652,293.

Patented June 26, 1900.

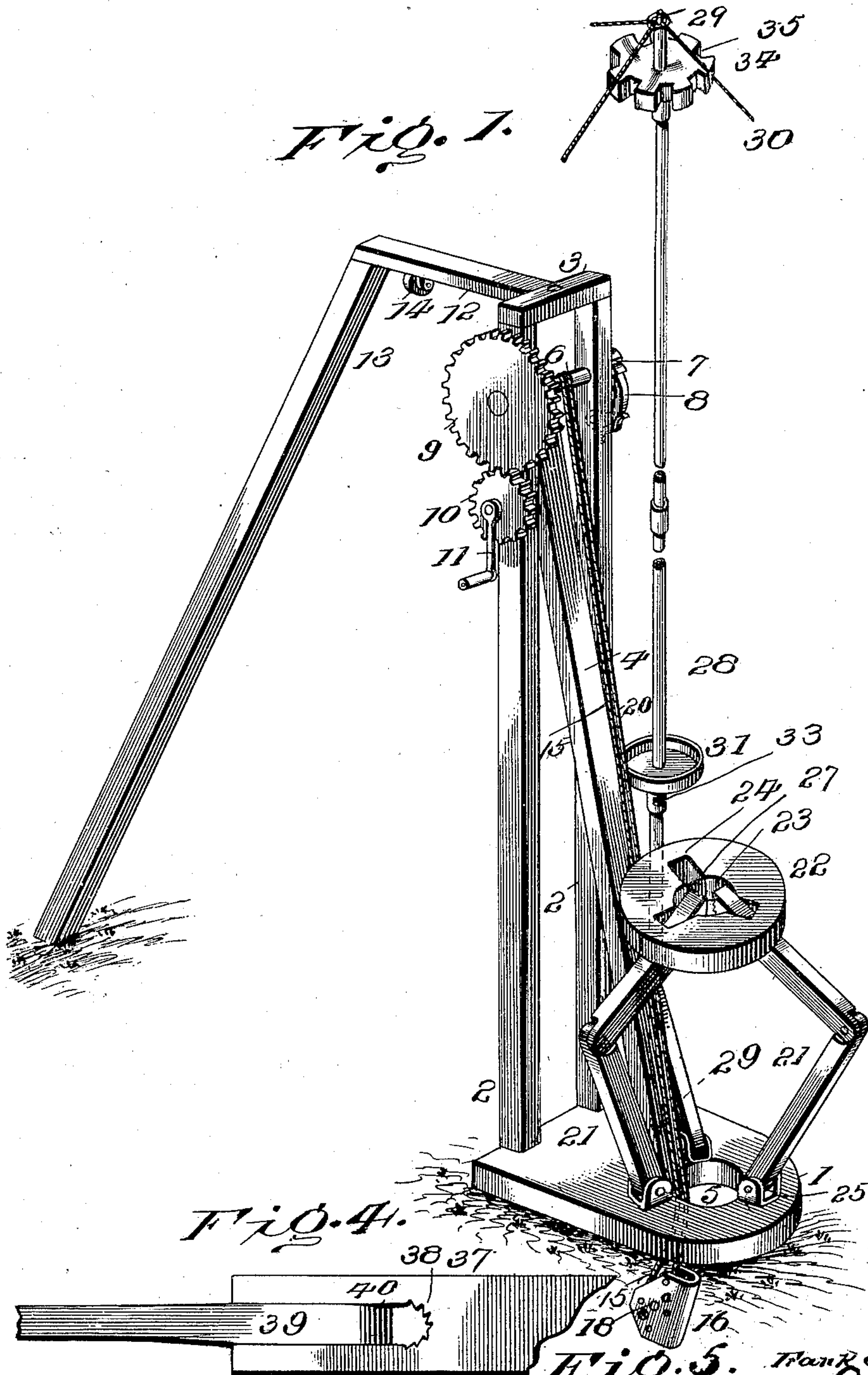
F. SCHNEIDER, JR.

HOISTING APPARATUS FOR WELL TUBING.

(Application filed Aug. 17, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

In mine

Deniza J. Matthews.

Frank Schneider, Jr. ^{Inventor}

R. A. Kacey
-his Attorneys

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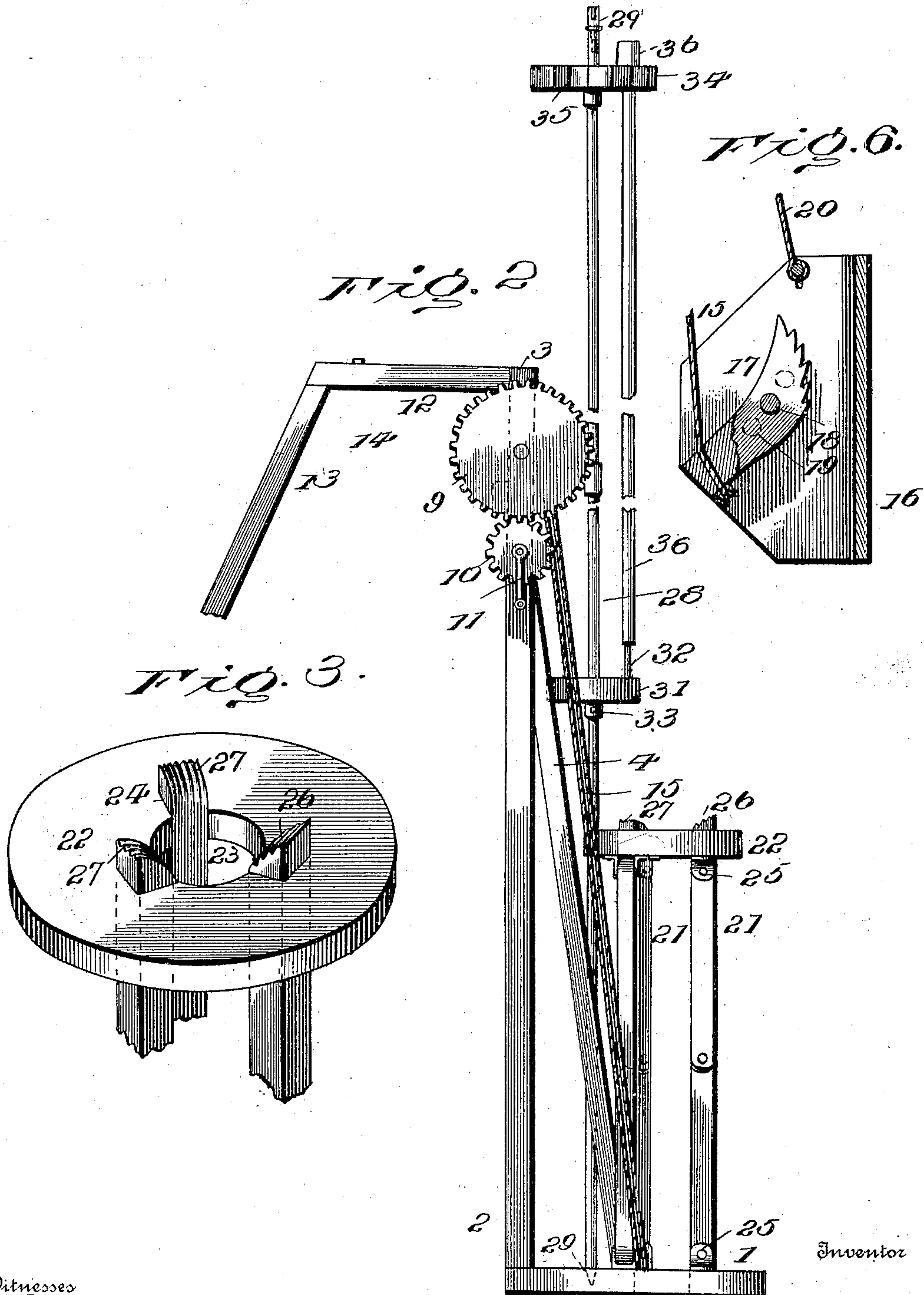
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2 Sheets—Sheet 2.



Witnesses

J. J. Miller
Denise J. Matthews

Frank Schneider, Jr.
by *R. H. Racey*, his Attorney.

UNITED STATES PATENT OFFICE.

FRANK SCHNEIDER, JR., OF GLEN HAVEN, WISCONSIN.

HOISTING APPARATUS FOR WELL-TUBING.

SPECIFICATION forming part of Letters Patent No. 652,293, dated June 26, 1900.

Application filed August 17, 1899. Serial No. 727,530. (No model.)

To all whom it may concern:

Be it known that I, FRANK SCHNEIDER, Jr., a citizen of the United States, residing at Glen Haven, in the county of Grant and State of Wisconsin, have invented certain new and useful Improvements in Hoisting Apparatus for Well-Tubing; 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 relates to apparatus for raising and lowering pump-tubing into oil, Artesian, and other deep wells and in which said tubing is composed of sections joined by any well-known coupling means, preferably by screw-thread joints.

The apparatus comprises in its organization a draft-cable, a grip at the free end of the cable for automatically taking hold of the pump-tubing and adapted for automatic release to slide upon said tubing to obtain a new hold at a lower point for lifting or at a higher point when lowering the tubing into the well, an operating-cord connected with the grip to move it to the required position, a holder to fix the position of the tubing when raising or lowering at such times when it becomes necessary to readjust the grip or when it is required to couple or uncouple sections of the tubing, a windlass for the draft-cable, and a hanger or rack for supporting the sections of the well-tubing and pump-rod in an upright position, said rack being revoluble about a vertical axis to admit of the sections of pump-rod and tubing being brought into position for convenience of coupling or moved aside to make room for other sections when removing the tubing and pump-rod from the well.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and the drawings hereto attached.

While the essential and characteristic features of the invention are necessarily susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of the appa-

ratus. Fig. 2 is a side elevation, parts being broken away, showing the apparatus operatively related. Fig. 3 is a detail perspective view of the upper portion of the holder on a larger scale. Fig. 4 is a top plan view of the wrench for holding the tubing when coupling and uncoupling the sections. Fig. 5 is a side elevation of the wrench, parts being broken away. Fig. 6 is a sectional detail view of the grip.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The operating parts of the apparatus are mounted upon a stand, and the latter consists of a base 1, spaced uprights 2, connected at their upper ends by means of a cross-piece 3, and an upright brace 4. The uprights 2 are located at one end of the base, and the opposite end is provided with an opening 5, through which the pump-tubing is adapted to pass when lowered into the well or withdrawn therefrom. A windlass 6 is journaled in the upper ends of the uprights 2 and has its ends projecting beyond the outer sides of the said uprights to receive the detent mechanism and make connection with the operating-gearing, respectively. The detent mechanism consists of a ratchet-wheel 7, applied to one end of the windlass, and a dog 8, pivotally connected with the upright adjacent to said ratchet-wheel and adapted to cooperate with the teeth thereof and prevent the windlass from turning backward when the draft-cable is wound thereon. The operating mechanism for the windlass consists of a gear-wheel 9, secured to the projecting end of the windlass, and a pinion 10, intermeshing with the gear-wheel 9 and provided with a crank or operating handle 11. The pinion 10 is mounted upon a stud or pin projecting laterally from the upright adjacent to the gear-wheel 9.

An arm 12 projects horizontally from the cross-piece 3 and is supported at its outer end by means of a stay or brace 13, rigidly attached thereto, said arm having detachable connection with the cross-piece, so as to be readily placed in position and removed, as required. A pulley 14 is pendent from the arm 12, and the draft-cable 15 is adapted to pass therethrough, the lower end of the draft-ca-

ble being adapted to be secured to the pump when it is required to initially elevate the pump-tubing to provide for the uncoupling of the pump therefrom in a convenient and expeditious manner. The grip applied to the free end of the draft-cable 15 consists of a frame 16, formed of a stout metal plate folded upon itself, and this frame is closed upon three sides and is open at the fourth side. A dog 17 is pivoted intermediate of its ends, so as to operate through the open side of the frame 16, the inner end of the dog being of cam form and toothed or roughened, so as to bite into the pump-tubing and prevent slipping of the grip when the lifting force is applied thereto. The draft-cable 15 is connected with the outer end of the dog 17. Hence the lifting force is exerted to cause the dog 17 to positively grip and hold the tubing when suspended by means of the elevating force. The fulcrum-pin 18, upon which the dog 17 is pivotally mounted, has adjustable connection with the frame 16 by being passed through one of a series of openings 19, formed in the side walls of the frame in transverse alinement. By this means the grip can be readily adapted to pump-tubing varying in diametrical extent. An operating-cord 20 has connection with the upper end of the grip 16 and is designed to raise or lower the grip to the required elevation. When the draft-cable is slackened, the outer end of the dog 17 will gravitate, being of superior weight, and will automatically disengage the biting end of the dog from the tubing, and by operating the cord 20 the grip can be raised or lowered, as desired. After the grip has been properly positioned with reference to the pump-tubing a pull upon the draft-cable will elevate the outer end of the dog 17 and cause the inner end of said dog to bite into the tubing and fix the position of the grip, so that the pump-tubing can be suspended solely by means of the draft-cable, and the latter may be utilized either for raising or lowering the pump-tubing, as required.

Combined with and forming an essential part of the apparatus is a holder for securing the pump-tubing during the interval of readjusting the grip. This holder consists of a series of toggle-levers 21 and a ring or plate 22, the latter having a central opening 23 and a series of notches 24, extending outward from the opening 23 and in which the upper ends of the toggle-levers operate. Spaced ears 25 are pendent from the ring or plate 22, and their vertical portions are about in line with the side walls of the notches 24, and the upper ends of the toggle-levers are received between the respective spaced ears and are pivoted thereto. The lower ends of the toggle-levers are connected to the base 1 in a similar manner. Any desired number of toggle-levers may be employed, and they are grouped about a central line. In practice three sets of toggle-levers have been found adequate for all purposes, one set of toggle-

levers being disposed at the outer end of the base opposite the brace 4 and the other two upon opposite sides of said brace and adjacent thereto. These toggle-levers are equally spaced about the openings 5 and 23. The upper members of the toggle-levers are pivoted a short distance from their upper extremities, and the latter have their inner corners made rounding to provide gripping-jaws, and these jaws are toothed, serrated, or roughened to engage positively with the sides of the pump-tubing. The teeth or serrations 26 of the outermost toggle-lever extend horizontally, whereas the teeth or biting edges 27 of the inner toggle-levers project vertically to engage with the sides of the pump-tubing and prevent relative turning thereof. The horizontal teeth 26 when in engagement with the pump-tubing prevent downward displacement thereof. When elevating or lowering the pump-tubing, the members of the toggle-levers are brought into vertical alinement, thereby withdrawing their jaws from the path of the pump-tubing, so as to admit of the latter moving freely. When during the elevating or lowering operation it becomes necessary to readjust the grip, the toggle-levers are moved outward at their articulating-joints, thereby causing the jaws of the upper members to move inward and grip the sides of the pump-tubing and hold the latter firmly and securely against vertical displacement and horizontal turning. When the pump-tubing is gripped between the jaws of the toggle-levers, the grip 16 can be moved up or down on the pump-tubing as required and in the manner herein set forth. When positioned by means of the holder, the pump-tubing can be lengthened or shortened either by the coupling of sections thereto or the removal of sections therefrom. After the grip has been readjusted and caused to engage with the pump-tubing the toggle-levers are operated to bring their members into vertical alinement, thereby releasing their jaws from the sides of the pump-tubing, which latter can be elevated or lowered, as may be required. The projecting or toothed ends of the levers constitute grippers or catches which are positively actuated by the combined movement of the plate 22 and the toggle-levers to cause them to take hold of or release the tubing, as required. The toggle-levers, besides connecting the plate 22 with the base 1 so as to positively actuate the grippers, hold said plate and grippers from turning when screwing or unscrewing the pipe-sections.

A rack or hanger forms an essential part of the apparatus and receives the sections of the pump-tubing and holds them in convenient position either for coupling or for storing when uncoupling the sections when withdrawing the pump-tubing from the well. This hanger or rack comprises a central support 28, consisting of gas-pipe composed of jointed sections. This support is mounted

upon the base or plate 1 of the stand in such a manner as to rotate about a vertical axis. A journal 29 is applied to the upper end of the central support in such a manner as to admit of the latter being turned freely, and guy-ropes 30 are applied at their upper ends to said journal and have their lower ends staked to the ground a proper distance from the base 1, so as to steady and fix the position of the rack or hanger. A cup 31 is applied to the lower end of the central support 28 and is designed to receive the lower ends of the pump-rod sections 32, and this cup is adjustable vertically upon the support 28 by means of a clamp-screw 33, fitted in a threaded opening of a collar projecting from the cup and adapted to have its inner end impinge against the side of the support with sufficient pressure to secure the cup in an adjusted position. A plate or disk 34 is applied to the upper end of the central support 28 and is provided at intervals in its peripheral edge with notches or seats 35 for the reception of the upper ends of the sections 36, comprising the pump-tubing. The sections 36 are suspended from the plate or disk 34 by means of the coupling-sleeves at their upper ends overlapping the side walls of the notches 35 and engaging with the upper face of the plate 34 adjacent to the walls of said notches or seats.

In the practical operation of the apparatus and it being required to withdraw the pump-tubing from the well the device is placed with the stand at one side of the pump and the stay or brace 13 at the opposite side, the arm 12 extending over and alining vertically with the pump. The grip is detached from the free end of the draft-cable 15, and the latter is passed through the block and over the pulley 14 and has its lower end engaged with the pump, preferably at a point below the spout, in such a manner as to prevent slipping. After the lower end of the draft-cable has been securely hitched to the pump the windlass 6 is operated to wind up the draft-cable and elevate the pump-tubing connected therewith. After the pump-tubing has been elevated a proper distance—about four to six inches—the tubing is gripped and the pump disconnected therefrom in any convenient manner. The tubing is secured by means of a wrench, the latter consisting of a bar 37, having one end bifurcated and having the wall at the inner end of the space formed between the bifurcations toothed, as shown at 38, the teeth extending transversely of the bar and in opposite directions, so as to engage positively with the sides of the tubing upon opposite sides of a central line, so as to prevent turning thereof in either direction. A short lever 39 is pivoted between the bifurcations of the bar 37, and its inner end is of cam form and transversely toothed, as shown at 40. Upon operating the short lever the tubing is gripped between its inner end and the wall at the inner end of the bifurcations. This wrench

may be advantageously applied to the tubing either in conjunction with the holder comprising the series of toggle-levers to prevent relative turning of the sections of the pump-tubing or coupling them by means of screwing or unscrewing. After the pump-tubing has been initially withdrawn in the manner set forth the apparatus is shifted so as to bring the opening 5 of the base directly in line with the pump-tubing and over the well-curb. The grip 16 is applied to the projecting end of the tubing, and the latter is elevated by winding the draft-cable upon the windlass in the manner set forth. After the pump-tubing has been withdrawn so as to elevate the grip to the highest practicable point the holder is operated so as to fix the position of the tubing, and when the latter is gripped by means of the holder the grip 16 is lowered in the manner set forth, so as to obtain a new hold upon the tubing at the lowest point possible. The grip when positioned is caused to automatically take hold of the tubing by drawing upward upon the draft-cable. The pump-tubing is now released from the holder and is again elevated. When the tubing is withdrawn from the well so as to bring a section above the holder applied to the stand, said section is uncoupled and engaged with the rack or hanger, as set forth. This operation is repeated until the entire tubing is withdrawn from the well. The sections of the pump-rod are not disconnected from the respective sections of the pump-tubing and are supported by resting in the cup 31, as previously explained. When it is required to lower the pump-tubing into the well, the reverse of the operation herein described is practiced.

By having the central support or upright 28 of the hanger or rack made in sections and detachably connected with the stand and by having the arm 12 and stay 13 detachably fitted to the stand the apparatus can be reduced to a compact form for convenience of handling, storing, and transportation. The guy-ropes 30, which steady and fix the position of the upper end of the rack, also serve to hold the apparatus in place when adjusted. The length of the central support 28 of the hanger will depend upon the length of the sections comprising the pump-tubing.

Having thus described the invention, what is claimed as new is—

1. In apparatus for raising and lowering pump-tubing, a holder comprising a base, a plate provided with pivoted grippers and movable toward and from the base, and direct connections between the plate and base and adapted to positively actuate the grippers in both directions to cause them to take hold of and to release the tubing, substantially as described.

2. In apparatus for raising and lowering pump-tubing, a holder comprising a base, a plate provided with grippers and movable toward and from the base, and toggle-levers

connecting the plate with the base and adapted to positively actuate the grippers upon movement of the plate, substantially as set forth.

5 3. In apparatus for raising and lowering pump-tubing, a holder comprising a relatively-movable plate having an opening for the passage of the tubing, grippers pivotally connected to the plate and grouped about the
10 opening, and connections joining the plate to a support and adapted for positive actuation of the grippers in both directions, substantially as described.

15 4. In apparatus for raising and lowering pump-tubing, a holder comprising a plate having an opening and a series of notches extending outward from the opening, and a series of levers pivotally connecting the plate to a support and having an end portion fitted
20 in the aforesaid notches and extended beyond the pivotal connection with the plate to form grippers to project into the opening of the plate, substantially as specified.

25 5. In apparatus of the character set forth, a base having an opening, a plate provided with a corresponding opening, and toggle-le-

vers connecting the plate with the base and pivotally attached to each, the upper ends of the toggle-levers being pivotally connected at their extremities to said plate, whereby the upper terminals of the toggle-levers are adapted to project into the opening of the plate and engage with the sides of the tubing, substantially as set forth. 30

6. In apparatus of the character described, 35 a base having an opening, a plate provided with a corresponding opening and having notches extending outward from said opening, spaced ears pendent from the plate and located upon opposite sides of the notches 40 thereof, and toggle-levers connecting the base and plate and having their upper ends received between the respective spaced ears and arranged to operate in the said notches and adapted to engage with the sides of the tubing, substantially as described. 45

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

FRANK SCHNEIDER, JR. [L. S.]

Witnesses:

G. HENRY THOLE,
JAMES SCHNEIDER.