M. T. CHAPMAN.

WELL SINKING APPARATUS.

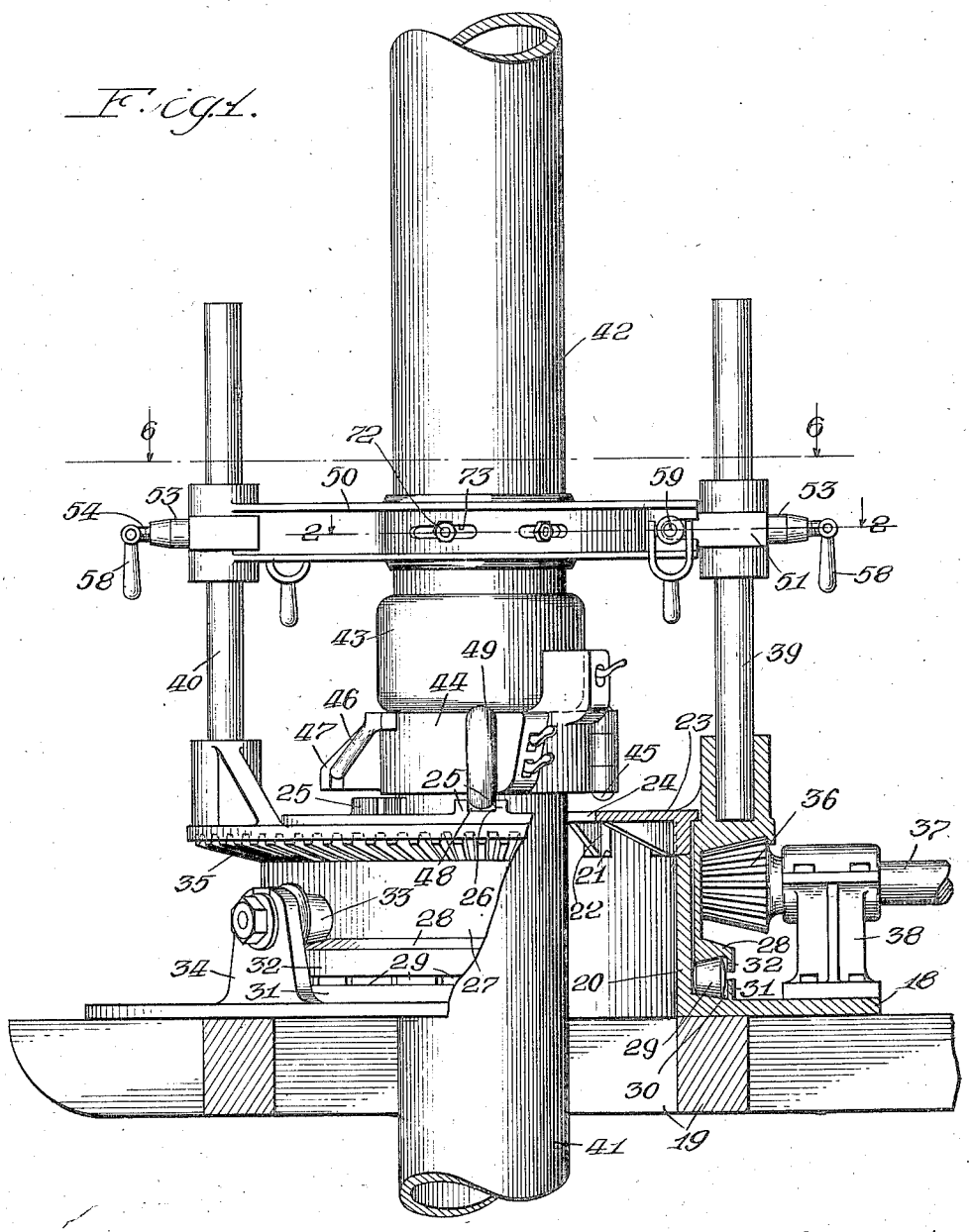
APPLICATION FILED JUNE 2, 1913.

1,163,213.

Patented Dec. 7, 1915.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

P. L. Farrington

L. B. Graham

Inventor

Matthew T. Chapman

By Adams & Jackson

Attys.

M. T. CHAPMAN.

WELL SINKING APPARATUS.

APPLICATION FILED JUNE 2, 1913.

1,163,213.

Patented Dec. 7, 1915.

3 SHEETS—SHEET 2.

Fig. 2.

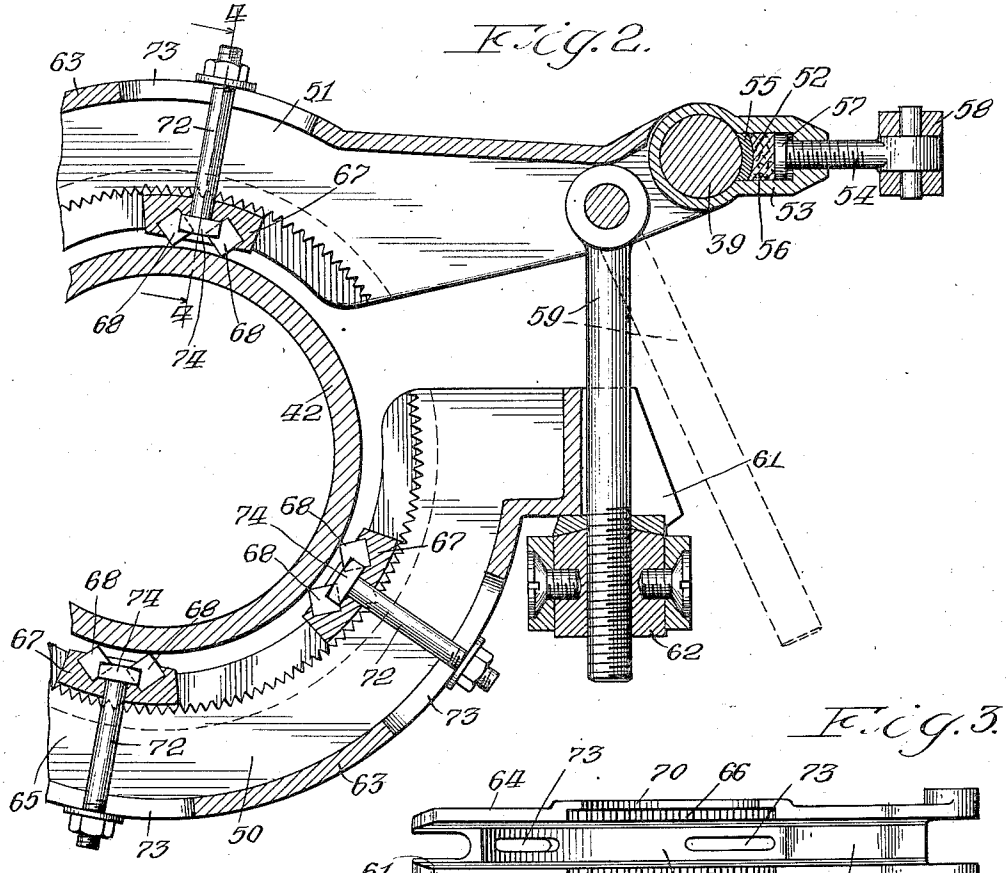


Fig. 3.

Fig. 4.

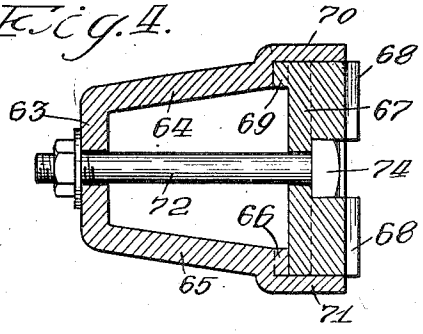
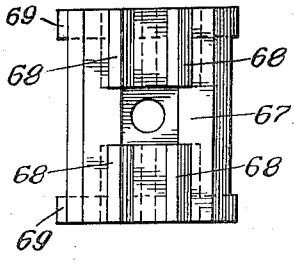


Fig. 5.



Witnesses:

R. L. Farrington

L. B. Graham

Inventor

Matthew T. Chapman

By Adams & Judson

Attys.

M. T. CHAPMAN.

WELL SINKING APPARATUS.

APPLICATION FILED JUNE 2, 1913.

1,163,213.

Patented Dec. 7, 1915.

3 SHEETS—SHEET 3.

Fig. 6.

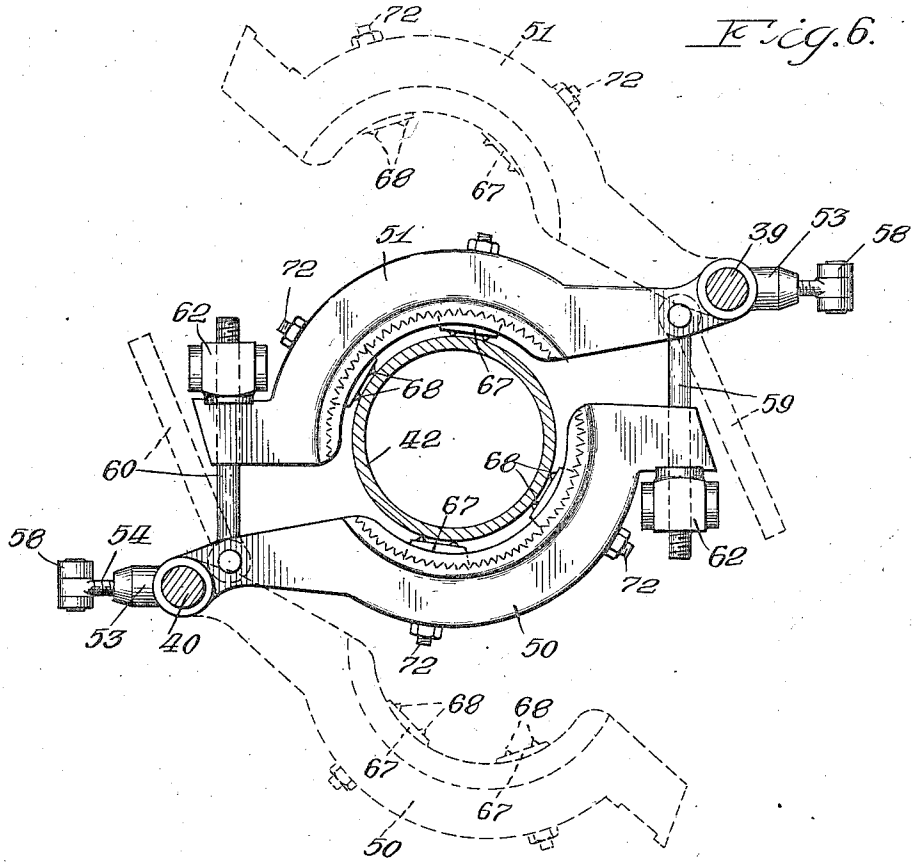
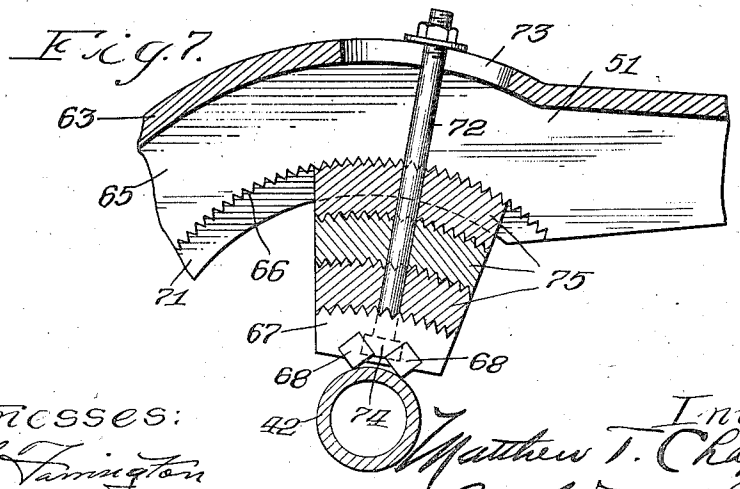


Fig. 7.



Witnesses:

P. L. Farrington

L. B. Graham

Inventor

Matthew T. Chapman

By Adams & Jackson

Attys.

UNITED STATES PATENT OFFICE.

MATTHEW T. CHAPMAN, OF AURORA, ILLINOIS, ASSIGNOR TO THE AMERICAN WELL WORKS, OF AURORA, ILLINOIS, A CORPORATION OF ILLINOIS.

WELL-SINKING APPARATUS.

1,163,213. Specification of Letters Patent. Patented Dec. 7, 1915.

Original application filed May 16, 1910, Serial No. 561,596. Divided and this application filed June 2, 1913. Serial No. 771,153.

To all whom it may concern:

Be it known that I, MATTHEW T. CHAPMAN, a citizen of the United States, residing at Aurora, in the county of Kane, State of Illinois, have invented certain new and useful Improvements in Well-Sinking Apparatus, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to apparatus for boring wells, and has for its object to provide certain improvements in the mechanism employed for gripping and rotating the pipe in the various operations that must be performed, such as rotating the pipe for boring the well, and for supporting sections of the pipe in coupling or in disconnecting the sections.

My improvements relates more particularly to the construction of the turntable which carries the pipe gripping and supporting devices; to the mechanism for gripping the pipe for rotating it either in boring the well or when one section is being connected to or disconnected from another; and to mechanism for supporting the pipe as occasion may require.

The boring and casing pipes, whose sections are joined together by screw-threads, vary in diameter from one to twenty inches, and the tools used for gripping the pipes for turning or for connecting the sections of pipe together or for taking them apart are heavy and difficult to handle. My invention in part seeks to save a large amount of such labor by swingingly mounting the pipe gripping means so as to be carried around by the turntable, which enables the pipe gripping means to be swung toward the pipe for engagement with it for gripping it for turning purposes, and, when disengaged from the pipe, to be swung back out of the way in readiness to be connected with another section.

I accomplish my objects as illustrated in the drawings and as hereinafter described.

What I regard as new is set forth in the claims.

This application is a division of application Serial No. 561,596, filed May 16, 1910.

In the drawings,—Figure 1 is a side elevation, some parts being broken away. Fig. 2 is an enlarged detail, being a partial horizontal sectional view showing the construction of the gripping mechanisms; Fig. 3 is an edge view of one of the swinging arms or members of the gripping mechanism; Fig. 4 is an enlarged sectional view of a part of the gripping mechanism taken on line 4—4 of Fig. 2; Fig. 5 is a face view of the toothed head shown in Fig. 4; Fig. 6 is a view of the gripping mechanism taken substantially on line 6—6 of Fig. 1; and Fig. 7 is an enlarged detail, being a partial horizontal section of one of the gripping members, showing the arrangement of parts for adapting the gripping devices to fit pipes of different sizes.

Referring to the drawings,—18 indicates the bed-plate or base of the turntable, which is preferably mounted on a suitable frame or support 19 and is provided with an upwardly-extending annular sleeve 20, as best shown in Fig. 1. Said sleeve is provided at its upper edge with a series of notches 21 arranged at suitable intervals, which are adapted to receive downwardly-projecting lugs 22 carried by a cover-plate 23 which is adapted to fit upon the upper edge of the sleeve 20, as best shown in Fig. 1. By this construction the cover-plate 23 is held fixedly against rotation. Said cover-plate is provided at the center with a circular opening 24 for the passage of the well-tube or pipe, and around said opening at intervals are pairs of lugs 25, thereby providing notches 26 for holding the pipe against rotation, as hereinafter described. The cover-plate 23 is removable, so that if desired cover-plates having different sized openings 24 may be employed with well-tubes of different sizes. The bed-plate 18 with the sleeve 20 and cover-plate 23 constitute the stationary member of the turntable.

The rotary member of the turntable is composed of a vertically-disposed sleeve 27 which fits around the outside of the sleeve 20 and is provided at its lower edge with a flange 28 which forms an annular bearing for conical antifriction rollers 29, as shown in Fig. 1. Said rollers are placed in an annular runway 30 provided on the bed-plate 18, as shown, and they are held in place by an upwardly-extending flange 31 carried by the bed-plate and a downwardly-extending flange 32 carried by the flange 28, as best shown in Fig. 1. The rotary member 27 is held down by a series of rollers 33 carried by lugs 34 rising from the bed-plate and

bearing on the upper surface of the flange 28 which is suitably shaped to form a track for said rollers.

The rotary member 27 is caused to rotate by means of an annular rack 35 provided near its upper margin, said rack being engaged by a pinion 36 mounted on a driveshaft 37, said shaft having a bearing in a standard 38, as shown in Fig. 1. Obviously, by rotating the shaft 37 the rotary member 27 will be caused to rotate, traveling upon the rollers 29. By mounting the rotary member outside of the stationary member in the manner described, it is prevented from being accidentally displaced, and, moreover, the central opening for the passage of the pipe may be made much larger than in former constructions.

39 40 indicate upright posts carried at opposite sides of the rotary member 27, which posts carry the devices for gripping the well-tube, as hereinafter described.

41 42 indicate lower and upper sections of the well-tube, which are united by a screw-threaded coupling 43, as shown in Fig. 1.

44 indicates a clamp for supporting the well-tube when connecting or disconnecting two sections thereof and for holding the lower section against rotation in either direction. Said clamp is composed of two members hinged together at one side by a pivot 45 and adapted to be secured together at the other side by a latch in the form of a swinging link 46, which is mounted in and embraces lugs 47 projecting from the two members of the clamp, as shown and described in my United States Patent No. 1,079,539, granted November 25, 1913. The interior diameter of the clamp 44 is substantially the same as the exterior diameter of the well-tube, so that when said clamp is secured upon the well-tube below the coupling 43 it is adapted to rest upon the cover-plate 23 and support the well-tube. For the purpose of locking the clamp 44 against rotation when resting on said cover-plate, it is provided at opposite sides with depending lugs 48 which fit in the notches formed by the lugs 25 rising from the cover-plate, as shown in Fig. 1. Thus the clamp 44 is held fixedly against rotation, but may readily be disconnected from the cover-plate when desired by lifting the well-tube slightly. In order to hold the well-tube against rotation in either direction when the clamp 44 is in position thereon, the members of said clamp are provided with gripping devices of any suitable well-known type.

49 indicates lugs projecting at opposite sides of the clamp 44, said lugs being preferably in the form of eyes which may be engaged by hoisting mechanism for lifting the clamp and well-tube.

For the purpose of rotating the well-tube in sinking the well or for rotating the upper section 42 of the well-tube in connecting or disconnecting sections thereof, I employ gripping mechanism which will now be described. 50—51 indicate coacting gripping-levers, which are in part semicircular in form and are pivotally mounted upon the posts 39 40, as best shown in Figs. 1 and 6. Said levers are adapted to slide longitudinally of their respective posts, and in order to control the freedom with which they slide thereon I provide brakes 52 which are fitted in suitable boxes 53 with which said levers are provided and are adapted to bear against their respective posts, as shown in Fig. 2. The brakes 52 may be pressed against their respective posts by screws 54 fitted in said boxes 53, as shown in Fig. 2, so that if desired the levers 50—51 may be permitted to slide freely upon the posts or may be secured thereon so that they do not slide at all. Each of the brakes 52 comprises a brake-shoe 55 adapted to bear on the post, a rubber block or cushion 56 which bears against the shoe, and a plate 57 interposed between said cushion and the end of the screw 54, thus providing a degree of flexibility in the action of the brake. 58 indicates a handle for rotating the screw 54.

The two levers 50—51, when in operative position, extend at opposite sides of the well-tube and are connected together by swinging bolts or links 59—60—the bolt 59 being pivoted to the lever 51 near the post 39 and being adapted to fit in a slot provided in the outer end of the lever 50, while the bolt 60 is pivoted in a corresponding position on the lever 50 and enters a slot in the end of the lever 51, as clearly shown in Figs. 2 and 6. Said slots are indicated in Fig. 2 by the number 61. Each of the bolts 59—60 is provided with a nut 62 which bears against the outer end of the lever which the free end of said bolt engages, as shown in Fig. 2. By adjusting the nuts 62 upon their respective bolts, the levers 50—51 may be caused to clamp the well-tube more or less tightly, as desired.

Each of the levers 50—51 is channeled, being composed of a vertical web 63 and upper and lower inwardly-projecting flanges 64—65, as shown in Fig. 4. The curved portions of said flanges 64—65 are provided with serrations or teeth 66, as shown in Figs. 2 and 3, for better securing the gripping devices thereto, as hereinafter described.

67 indicates gripping heads which carry teeth 68 which engage and bite into the well-tube to hold it against rotation, as hereinafter described. Said heads 67 are in the form of blocks of steel, or other suitable material, the outer surface of which is provided with serrated portions 69 adapted to engage

the serrations 66 of the levers 50—51. Said heads fit against the inner faces of the flanges 64—65 between overlapping lips 70—71, as shown in Fig. 4, and are held in position by bolts 72 which are adjustably secured in slots 73 in the levers 50—51, as shown in Figs. 2 and 4. The heads 67 are provided with suitable grooves to receive the teeth 68, which are short lengths of steel either square, triangular or otherwise angular in cross-section, and are held so as to present one edge thereof to the well-tube and in such position that such edge extends longitudinally thereof. Preferably each head carries four teeth 68, said teeth being arranged in upper and lower pairs held apart by the head 74 of the bolt 72, and when the head 67 is in operative position the lips 70—71 project beyond the outer ends of said teeth and prevent displacement thereof in an outward direction. It will be understood, of course, that the teeth 68 may be adjusted relative to the heads 67 so as to bring any one of the edges of the teeth into operative position. Any desired number of heads 67 may be employed, and the number of teeth carried by each head may, of course, be varied. Furthermore, the position of the several heads with respect to each other may be varied, as the heads may be adjusted upon their respective levers 50—51 to move them closer together or farther apart.

For operating upon small sizes of pipe, it may be necessary to set the heads 67 farther from the inner faces of the levers 50—51 than in the construction shown in Figs. 2 and 6, and in order to provide for the use of my improved apparatus on even the smallest sizes of pipe I employ a series of auxiliary heads or blocks 75, which are best shown in Fig. 7. Said blocks are segmental and are provided with serrations on both broad faces, so that they may be interposed between the head 67 and the flanges 64—65 of the gripping levers in the manner shown in Fig. 7. Thus the head 67 may be set as far in as may be necessary to secure a proper grip upon the well-tube. In order to remove the gripping levers from the well-tube, it is necessary only to release one or both of the bolts 59—60, and by adjusting such bolts the force with which the well-tube is gripped may be regulated at pleasure.

By my improved construction of gripping mechanism for rotating the well-tube, it will be apparent that by releasing the bolts 59—60 the levers 50—51 may be swung out away from the well-tube and may be supported by the posts 39—40, thereby exposing the upper portion of the turntable and permitting free access to the mechanism carried thereby as well as the free withdrawal of the well-tube, thus saving the labor of removing the gripping mechanism as has been necessary in prior constructions.

My invention is not restricted to the construction shown and described, except in so far as it is particularly claimed, but includes generically the subject-matter of the broader claims.

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

1. In a well-sinking apparatus, the combination of a turntable having upright posts, gripping devices for rotating the well-tube comprising members mounted upon said posts and adapted to move toward and from the well-tube, said gripping members having means for non-rotatably engaging the well-tube for rotating it, and means for clamping said gripping members upon said posts against vertical movement relative thereto.

2. In a well-sinking apparatus, the combination of a turntable, gripping devices adapted to engage the well-tube for rotating the same, comprising members mounted on the turntable and movable vertically with the well-tube and adapted to move toward and from the well-tube, means carried by said members for non-rotatably engaging the well-tube, and frictionally-acting means adapted to be adjusted to yieldingly resist the movement of the members with the well tube relative to the turntable, and stationary means for non-rotatably engaging a section of the well-tube and holding it against rotation.

3. In a well-sinking apparatus, the combination of a turntable, and gripping devices adapted to engage a well-tube for rotating it, said gripping devices comprising members mounted on the turntable and movable vertically with the well-tube and adapted to be moved toward and from the well-tube, frictionally-acting means adapted to be adjusted to yieldingly resist the movement of the members with the well tube relative to the turntable, and means mounted on said members for engaging the well-tube and holding it against longitudinal or rotary movement relative to said members.

4. In a well-sinking apparatus, the combination of means for holding the lower section of the well-tube below the coupling from rotation, a turntable having a post, a hinged adjustable clamp mounted on said post for gripping the upper section of the well-tube for rotating it whereby said clamp may be swung away from the well-tube upon said post, and frictional gripping means acting upon said post adapted to support the weight of the clamp but to permit the swinging of the clamp upon the post upon a suitable application of power thereto.

5. In a well-sinking apparatus, the combination of a non-rotary central member, a non-rotary plate resting thereon, a non-rotary pipe-clamp mounted on said plate, a rotary member, and a hinged clamp carried by

said rotary member and adapted to non-rotatably engage the upper section of the well-tube, said clamp being capable of being swung open to release the upper section of the well-tube without its removal from said rotary member.

6. A gripping device for non-rotatably engaging a tube, comprising oppositely-disposed levers having portions adapted to fit around the tube, said levers being fulcrumed at opposite sides of the tube, means detachably connecting the free end of each lever with the other lever near the fulcrum thereof, and gripping devices carried by said levers comprising heads having one or more teeth angular in cross-section and having projecting edges adapted to engage and bite into the tube.

7. A gripping device for non-rotatably engaging a tube, comprising oppositely-disposed levers having portions adapted to fit around the tube, said levers being fulcrumed at opposite sides of the tube, means detachably connecting the free end of each lever with the other lever near the fulcrum thereof, gripping devices carried by said levers comprising heads having one or more teeth angular in cross-section and having projecting edges adapted to engage and bite into the tube, and means adjustably securing said heads to said levers.

8. The combination with a lever, of a head, means securing said head to said lever, and one or more teeth carried by said head comprising blocks angular in cross-section, said teeth being fitted in grooves in said head and each having an edge projecting beyond the face thereof.

9. The combination with a lever, of a head, means securing said head to said lever, and one or more teeth carried by said head comprising blocks angular in cross-section, each of said blocks being fitted in a groove in said head and adapted to be adjusted therein to have any one of its edges project beyond the face of the head.

10. The combination of a lever having a serrated face, a block having a serrated face adapted to fit the serrated portion of said lever, a bolt for holding said block in position on said lever, and one or more teeth fitted in grooves in said block, each of said teeth being angular in cross-section and having an edge projecting beyond the outer face of said block.

11. The combination of a lever having a serrated face, a block having a serrated face adapted to fit the serrated portion of said lever, a bolt for holding said block in position on said lever, and a plurality of teeth carried by said block and fitted in grooves in said block, each of said teeth being angular in cross-section and having an edge projecting beyond the outer face of said block.

12. The combination of a lever having parallel flanges, a block fitted against said flanges, one or more teeth fitted in grooves in said block, each of said teeth being angular in cross-section and having an edge projecting beyond the face of said block; and lips carried by said flanges and overlying the ends of said block and teeth, and a bolt for securing said block in position.

13. In a well-sinking apparatus, the combination of a suitable support, a turntable mounted thereon, posts carried by said turntable, levers fitted to slide on said posts, means for connecting said levers together to form a clamp, gripping devices carried by said levers, and brake mechanism for controlling the freedom of movement of said levers on said posts.

14. In a well-sinking apparatus, the combination of a suitable support, a turntable mounted thereon, posts carried by said turntable, levers fitted to slide on said posts, means for connecting said levers together to form a clamp, gripping devices carried by said levers, brake mechanism for controlling the freedom of movement of said levers on said posts, said brake mechanism each comprising a shoe adapted to bear against the post, a plate, an elastic cushion between said plate and said shoe, and means for pressing said plate against said cushion.

15. A gripping device for well-sinking apparatus, comprising oppositely-disposed coacting levers, means for clamping said levers together, gripping devices carried by said levers comprising heads having teeth adapted to non-rotatably engage a round article, means for securing said heads to their respective levers, and means for adjusting said heads toward and from said levers.

16. A gripping device for well-sinking apparatus, comprising oppositely-disposed coacting levers, means for clamping said levers together, gripping devices carried by said levers comprising heads having teeth adapted to non-rotatably engage a round article, means for securing said heads to their respective levers, and one or more intermediate blocks adapted to be fitted between said heads and said levers.

MATTHEW T. CHAPMAN.

Witnesses:
W. H. De Busk,
W. A. Furnner.