

No. 763,253.

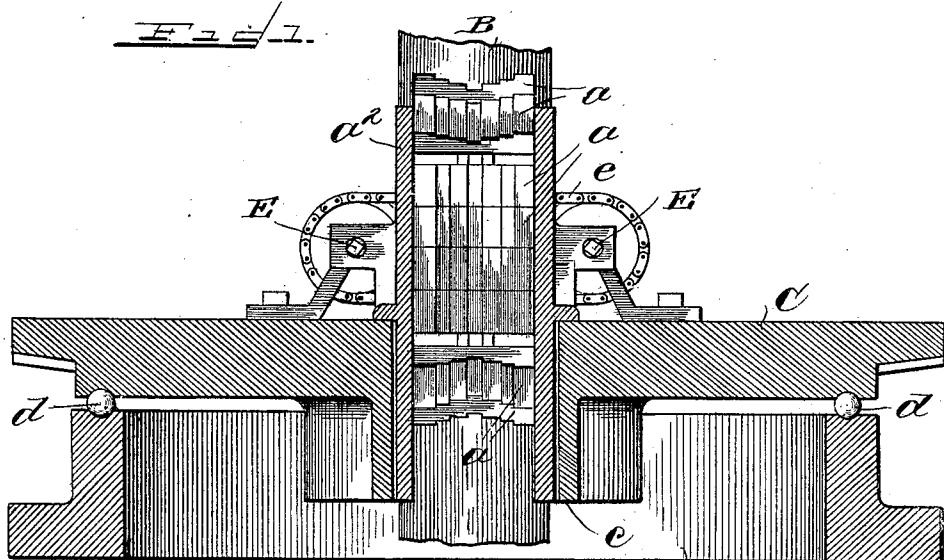
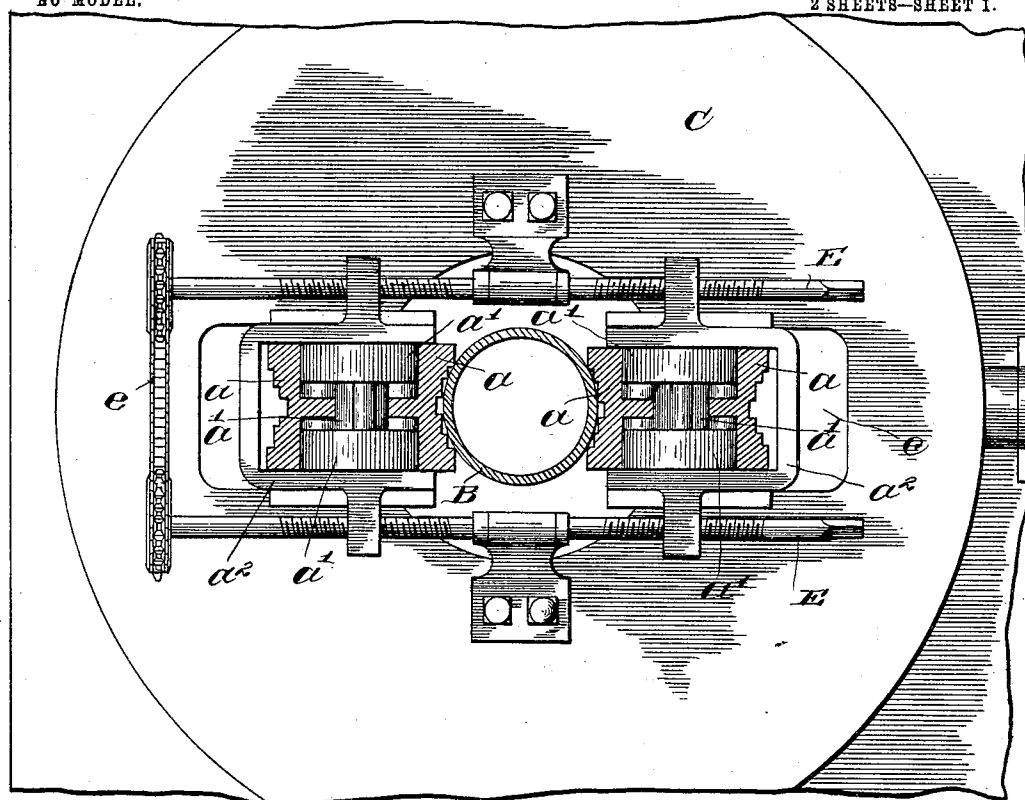
PATENTED JUNE 21, 1904.

M. G. BUNNELL.
WELL MACHINE.

APPLICATION FILED OCT. 16, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses.

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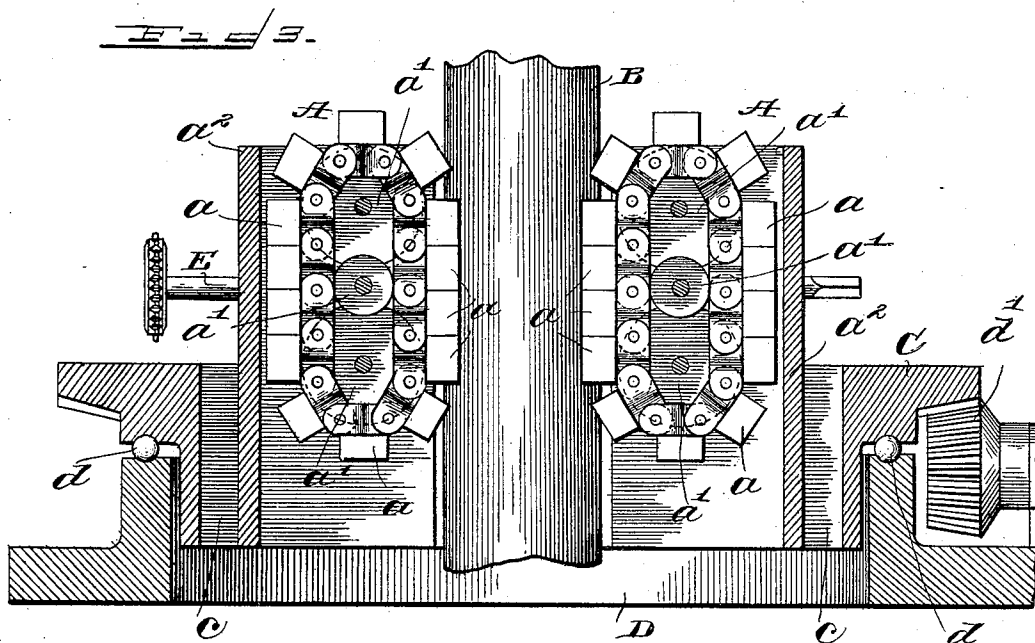


Fig. 3.

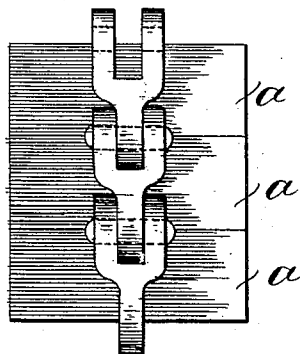


Fig. 4.



Fig. 5.

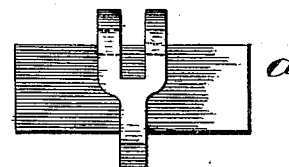


Fig. 6.

WITNESSES.

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UNITED STATES PATENT OFFICE.

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WELL-MACHINE.

SPECIFICATION forming part of Letters Patent No. 763,253, dated June 21, 1904.

Application filed October 16, 1901. Serial No. 78,813. (No model.)

To all whom it may concern:

Be it known that I, MORTON G. BUNNELL, a citizen of the United States, and a resident of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Well-Machines, of which the following is a specification.

My invention relates to well-machines of the rotary type, and has for its object the provision of a form of automatic pipe-grapple which will effectively grip and rotate the well-tube, and more particularly to provide a form of pipe-grapple for this purpose which will afford more extensive contact with the well-tube, thereby obviating the necessity of compressing the tube or pipe to such an extent as would be likely to crush it.

To the foregoing and other useful ends the jaws of the pipe-grapple can be constructed of chains or of a series of connected blocks or links having their faces adapted to engage and grip the well-tube. In this way each jaw can have a bearing-face of suitable length and character to grip and rotate the tube without necessitating objectionable compression of the tube. These chains or series of connected blocks or links forming the jaws can be suitably mounted upon suitable rolls or the like and can be backed in such manner as to enable the adjusting mechanism for the jaws to cause the biting or gripping faces of the links to impinge upon the cylindric face of the well-tube. The gripping-jaws thus constructed constitute an automatic pipe-grapple of such character as to not only grip and rotate the well-tube, but also to permit of a free longitudinal or end movement on the part of said tube. In this way the well-tube has a rotary movement and at the same time is allowed to sink gradually downward, so as to effect the desired drilling action at its lower end.

As stated, by constructing the jaws of the grapple of endless chains or in each case of a series of connected blocks or links a more extensive contact is secured between the jaws and the pipe, thereby making it possible to securely grip and rotate the pipe without compressing or squeezing it to such an extent as would be likely to crush or mutilate it. In other words, I provide a pipe-grapple

having jaws provided with traveling or endless gripping-faces adapted to make contact to quite an extent lengthwise along the surface of the well-tube. The nature and advantages of my invention will, however, hereinafter more fully appear.

In the accompanying drawings, Figure 1 is plan of a well-machine constructed in accordance with my invention. In this view the chains or series of connected blocks or links forming the jaws are shown in horizontal section. Fig. 2 is a vertical section on line 2 2 of Fig. 1. Fig. 3 is a vertical section on line 3 3 of Fig. 1. Fig. 4 is a detail showing the back of a number of the jaw links or blocks, the same being shown properly connected together. Fig. 5 is a view looking down on the top of the uppermost link shown in Fig. 4. Fig. 6 is a view of the back of a single link or block.

As thus illustrated, my invention comprises the oppositely-arranged gripping-jaws A A. These jaws are adapted to grip the well-tube B. The rotary base or turn-table C is constructed to provide a suitable support for said gripping-jaws and is preferably mounted upon a body or supporting-base D. It will be readily understood that suitable antifric-tion devices—such, for example, as the balls *d*—can be interposed between the said turn-table and the said base or body D. It will also be readily understood that any suitable means—such, for example, as the bevel *d'*—can be employed for rotating the said turn-table.

The well-tube B is, it will be observed, vertically disposed and is preferably of a form usually employed for sinking pipe-wells. In sinking wells of this character it is desirable to not only rotate the said tube, but also to allow the same to have a gradual downward shift or feeding movement, so as to cause the desired drilling action at the bottom of the well. For this purpose said gripping-jaws are, as stated, adapted to constitute an automatic pipe-grapple for gripping the tube and allowing it to shift gradually downward. In order to effect this desired movement of the tube, the said jaws are composed of endless chains formed of connected blocks or links,

the outer faces of these blocks or links being adapted to bite or grip the cylindric surface of the tube B. For example, each jaw may comprise an endless chain composed of the links or blocks *a*, which, it will be observed, are connected together in a manner similar to the links of a sprocket-chain. The two endless chains or belts thus provided can be trained over suitable idler-rolls *a'*. It will be observed that these rolls are preferably so arranged that each chain is capable of presenting a straightened portion of its length to the opposite sides of the tube B. In other words, each chain is capable of making a contact for some distance along the length of the well-tube. Said idle rolls *a'* can be suitably mounted in holders *a''*, preferably arranged for forward-and-back sliding movement in the recesses *c*. These recesses *c* in the turn-table hold the holders *a''* against lateral or side shift, but, as stated, permit the holders carrying the rolls and chains to have free forward-and-back or sliding movement in a direction to carry them toward and away from the well-tube B.

As a means for securing a simultaneous adjustment of the two gripping-jaws thus provided a pair of adjusting-screws E can be arranged to connect the two holders *a''*, it being desirable that these screws are mounted in suitable bearings on the turn-table C. These screws can be provided at one end with polygonal ends adapted to permit the application of a wrench or like tool and can have their opposite ends connected by a sprocket-chain *e*. With this arrangement it will be seen that the two jaws of the automatic pipe-grapple thus described can be caused to grip or release the well-tube B, the adjustment being also sufficient to permit the use of well-tubes of different sizes. The bearing-faces of the blocks *a* are, as stated, adapted to engage or bite the cylindric surface of the well-tube, and in this way the tube B rotates with the rotary movement of the turn-table C, and at the same time this tube B moves gradually downward, such downward movement causing the endless chains formed by the block or links *a* to travel around the supporting-rolls *a'*. The link or block *a* as it comes over the upper supporting-roll presents its gripping-face to the well-tube and makes sufficiently firm contact with the latter to effect the desired gripping action. In this way, as previously explained, the two jaws are of such character as to firmly grip or rotate the pipe without necessitating such a degree of compression as would be likely to crush the pipe. This is for the reason that the gripping-jaws may be of such character as to make contact for quite a distance along the length of the pipe. The increased bearing-surface thus provided for the jaws enables them to effectively grip and rotate the pipe, and, as will now be understood, it enables them to do so without any great degree of pressure on

their part. It will also be understood that the jaws can be constructed in various ways without departing from the spirit of my invention.

By referring to the drawings it will be seen that the holders for the chains are provided with lateral cheeks or flanges which embrace the chains and prevent lateral movement on the part of the latter while the turntable is rotating the pipe. In other words, each jaw is provided with a bearing which engages the side of the portion of the chain impinging upon the pipe and which resists the lateral thrust or pressure of such portion of the chain when the machine is in operation. In this way the chains can be more or less slack; but at the same time each chain will be held against lateral movement by the lateral cheek or bearing. In this way the chains are relieved of all injurious strains.

Broadly considered, my invention contemplates a pipe-grapple having traveling or endless gripping-faces adapted to present a straightened portion to the pipe, so as to make contact for some distance along the length of the latter.

While I have described my invention in connection with a well-machine, it is obvious that my improved form of pipe-grapple is well adapted for use in various other connections. For this reason I do not limit myself to the use of my invention in connection with well-machines.

What I claim as my invention is—

1. The combination of an upright cylindric tube adapted to be sunk in the ground, a rotary turn-table encircling said member, a plurality of radially-adjustable members mounted upon the top of said turn-table, and a vertically-disposed endless free-traveling link belt or chain mounted upon each of said adjustable members, said chains or link belts being adapted to impinge upon the cylindric surface of said upright member, so as to cause the latter to rotate with the turn-table, and each chain traveling freely with the downward or endwise movement of said upright member.

2. A well-machine comprising a pipe or well-tube, a rotary turn-table, a plurality of gripping-jaws mounted upon said turn-table and arranged to grip said pipe or tube, at least one of said jaws being provided with a chain adapted to impinge upon and travel with the endwise movement of said pipe or tube, said jaws being also provided with a pair of cheeks or flanges which prevent lateral movement of the portion of the chain engaging the pipe or tube, and the chain thus mounted compelling the pipe to rotate, but at the same time permitting the same to feed gradually downward.

3. A well-machine comprising a pipe or tube, a rotary turn-table, a plurality of jaws mounted upon said turn-table and arranged to grip said pipe or tube, at least one of said jaws being

provided with an endless and free-traveling chain or link belt, said chain or link belt being adapted to impinge upon the said pipe or tube and travel with the endwise movement of the latter, and power-transmitting connection for rotating the said turn-table, the said jaw thus provided with a gripping-chain being also constructed with a bearing which engages one side of the portion of the chain gripping the pipe or tube, said bearing resisting the lateral pressure or side thrust of the chain when the pipe is rotated by the rotation of the turn-table, and the chain thus mounted compelling the pipe to rotate, but at the same time permitting the same to have a free endwise movement.

4. A well-machine comprising a rotary member, an upright cylindric member extending through an opening in said rotary member, a plurality of jaws adjustably mounted on said rotary member, gearing for rotating said rotary member, each of said jaws being provided with an endless free-traveling link belt adapted to impinge upon the surface of said upright cylindric member and travel with the downward movement of the latter, and each jaw involving also a holder or mounting for the link belt, said holders or mountings being supported and arranged to slide toward and away from said upright cylindric member, and each holder or mounting being constructed with a portion which resists the lateral thrust or pressure of the portion of the chain engaging the upright cylindric member, when the latter is rotated.

5. A rotary well-machine, comprising a cylindric pipe or well-tube, a rotary turn-table through which said pipe or tube extends, adjustable members mounted upon said turn-table, said members being movable toward and away from the said pipe or tube, and endless gripping-chains mounted upon said adjustable members, each chain being adapted to impinge upon the surface of the said pipe or tube, the chains thereby permitting the rotary turn-table to rotate the pipe or tube, and said chains also being suitably mounted and arranged to permit the tube or pipe to have a free longitudinal or end movement.

6. In a machine for sinking holes in the ground, the combination of an upright cylindric member adapted to be sunk into the ground, a rotary member, gripping-jaws mounted upon said rotary member, each jaw being provided with an endless gripping-chain adapted to impinge upon or make contact with the cylindric surface of said upright cylindric member, said gripping-chains being mounted and arranged to present straightened portions which bear against and make contact for some distance along the length of said upright cylindric member, the jaws thereby rotating the upright cylindric member and permitting the same to have a free longitudinal or end movement, the said straightened por-

tions of the chains traveling or moving downward with the upright cylindric member.

7. In a rotary well-machine, the combination of a rotary turn-table, a rotary well-tube, a plurality of endless chains carried by said turn-table and adapted to serve as jaws for gripping and rotating said well-tube, and rolls adapted and arranged to back said chains.

8. In a well-machine, the combination of a well-tube, a rotary turn-table, and endless chains carried by said turn-table and adapted to serve as jaws for gripping and rotating said tube, said chains being composed of connected links or blocks having faces adapted to engage or bite the cylindric surface of said tube, and the said chains being so mounted and arranged as to present straightened portions which engage the well-tube for some distance along the latter's length.

9. In a well-machine, the combination of a rotary turn-table, a rotary well-tube, a plurality of endless chains carried by said turn-table and adapted to serve as jaws for gripping and rotating said well-tube, suitable rolls upon which the said chains are mounted, and adjustable members having suitable bearings for said rolls.

10. A rotary well-machine comprising a rotary turn-table, and gripping means adjustably mounted upon said turn-table and including an endless chain adapted to make contact with the well pipe or tube and to cause the latter to rotate with the turn-table, said chain traveling freely with the downward or endwise movement of the pipe or tube, substantially as described.

11. A well-machine comprising a rotary turn-table provided with a jaw having an endless gripping-chain adapted to impinge upon and cause a cylindric member to partake of the rotary motion of said turn-table, power-operated means for rotating said turn-table, and another jaw mounted on said turn-table and adapted to coöperate with said first-mentioned jaw in causing the cylindric member to partake of the rotary motion of said turn-table.

12. The combination with a rotatable platform, of a pair of jaws mounted thereon, each of such jaws comprising an endless chain of links, and a support upon which the links are adapted to be movably secured, substantially as specified.

13. The combination with a rotatable platform, of a pair of jaws mounted thereon, each of such jaws comprising an endless chain of links and each link having a face adapted to engage the surface of a pipe or tube, and a support upon which each of said chains of links is movably mounted, substantially as specified.

14. The combination with a rotatable platform, of a pair of jaws mounted thereon, each of such jaws comprising a chain of links, and a support for said chain upon which said chain

is adapted to move in a vertical plane, substantially as specified.

15. The combination with a rotatable platform, of a jaw mounted thereon, such jaw comprising an endless chain and a support therefor, such support having its outer face adapted to present a bearing for the links of the chain when such links are in working position, and another jaw opposing said first-named jaw, substantially as specified.

16. The combination with a rotatable platform, of a pair of jaws mounted thereon, each jaw comprising an endless chain the several links of which are each formed of a block having ears adapted to receive connecting-pivots, and having on the side opposite such ears a biting-face adapted to engage a pipe or tube, and a support upon which said chain is movably mounted, substantially as specified.

17. The combination with a rotatable platform, and a pair of jaws mounted thereon, each of said jaws comprising an endless chain and a support therefor upon which said chain is movably secured, of means for forcing each of said jaws toward the center of the machine to adapt one or more of the links of said chain to be brought into contact with a longitudinally-movable pipe or tube located between said jaws, whereby said pipe or tube can be turned with the rotation of the platform and at the same time be permitted a longitudinal movement, substantially as specified.

18. A clamping-jaw for the purpose described, consisting of a series of links secured

together, in combination with a support therefor on which said series of links are adapted to move when in use, substantially as specified.

19. A clamping-jaw for the purpose described, consisting of an endless chain the links of which have their outer faces formed to bite or otherwise engage the surface of a tube or pipe, in combination with a support on which said chain is adapted to move when in use, substantially as specified.

20. The combination with a rotatable platform, of a jaw adapted to be forced into holding engagement with a pipe or tube to cause said pipe or tube to be rotated with the rotation of the platform, said jaw comprising a series of engaging blocks or links, and a support for such series of blocks or links, said blocks or links being movably secured on said support, whereby the pipe or tube is permitted a longitudinal movement and the blocks or links are caused to successively engage the said pipe or tube, substantially as specified.

21. The combination with a suitable support, of a plurality of traveling blocks carried thereby and forming an endless bearing-surface adapted to operate as a gripping device, and means for holding said blocks in contact with the article to be gripped, substantially as specified.

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