No. 702,509. Patented June 17, 1902.

S. W. TITUS.

APPARATUS FOR ROTATING TUBING OR SIMILAR OBJECTS.

(Application filed Mar. 6, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

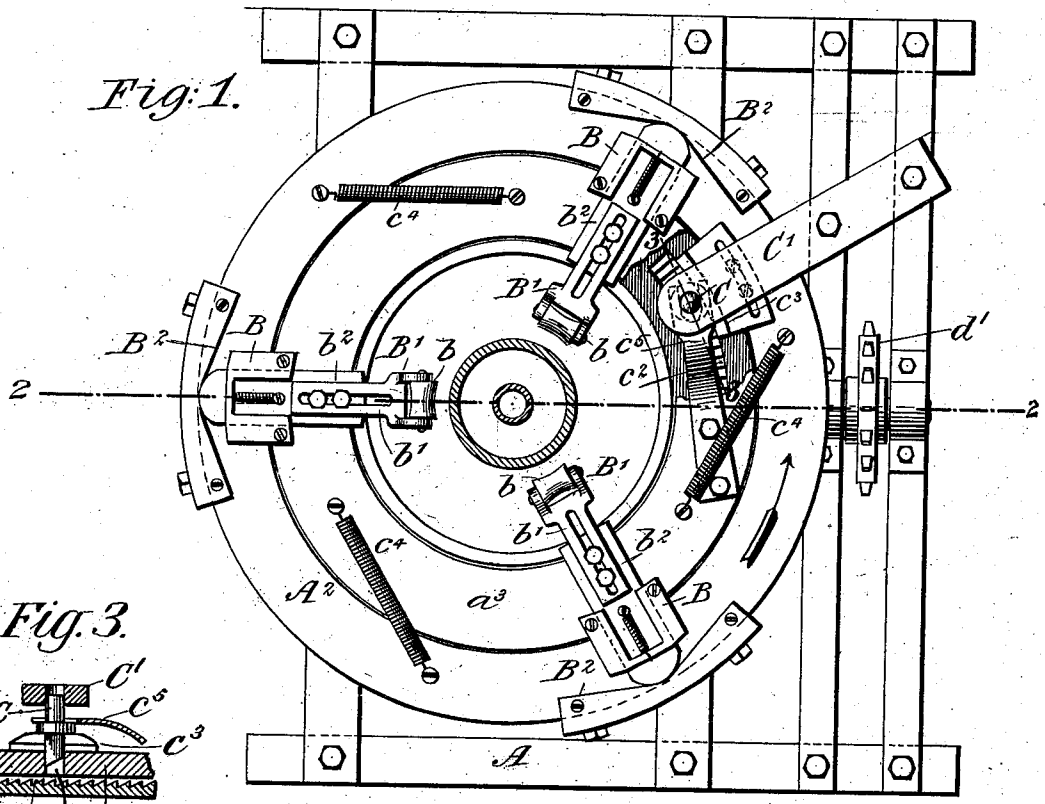
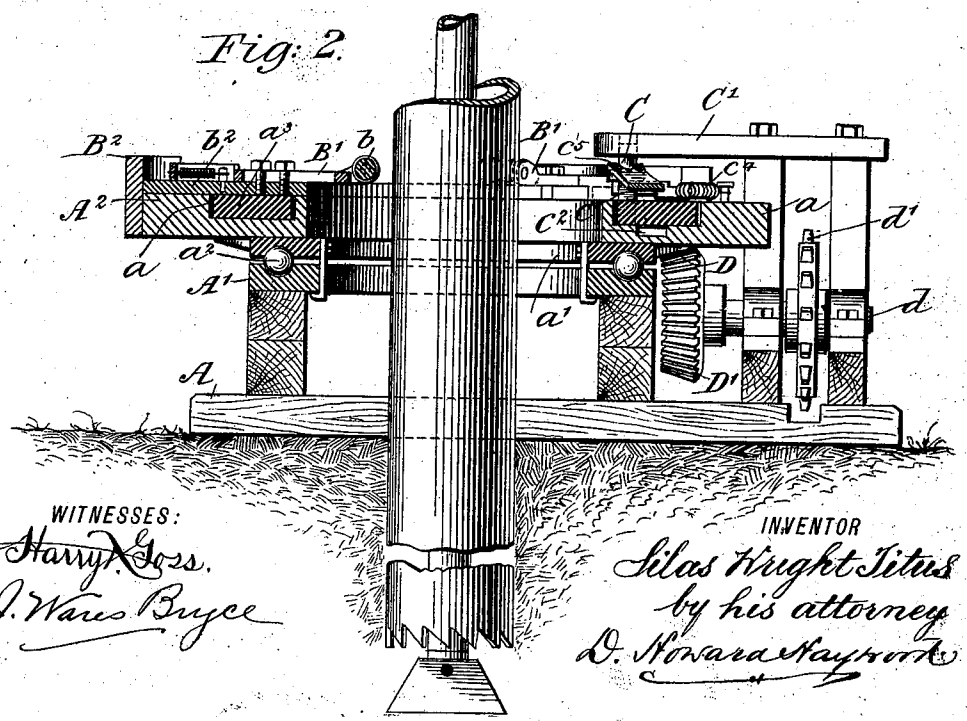


Fig. 3.

Fig. 2.



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Fig. 4.

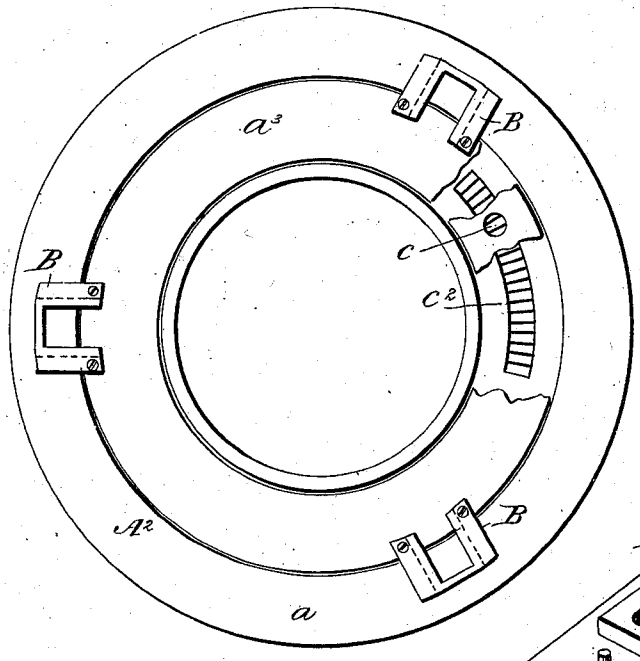


Fig. 6.

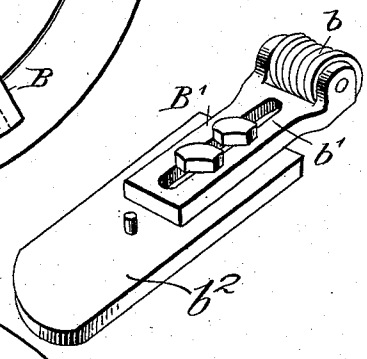
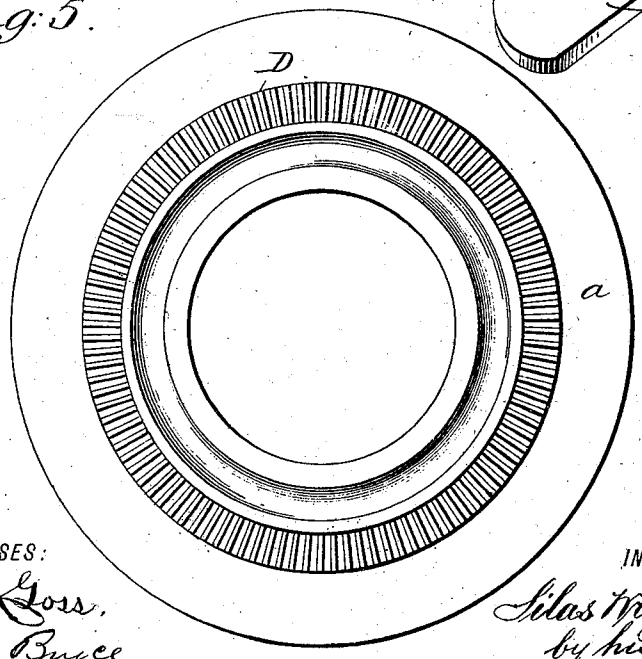


Fig. 5.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR ROTATING TUBING OR SIMILAR OBJECTS.

SPECIFICATION forming part of Letters Patent No. 702,509, dated June 17, 1902.

Application filed March 6, 1901. Serial No. 50,057. (No model.)

To all whom it may concern:

Be it known that I, SILAS W. TITUS, a citizen of the United States of America, and a resident of New York city, borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Apparatus for Rotating Tubing or Similar Objects, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to improvements in apparatus for rotating an object engaged thereby, and particularly for rotating a tube having connected thereto or formed at the lower end thereof a cutter, such tube and cutter adapted to be used for the purpose of tubular well-boring.

My invention consists in the provision of means whereby such tube may be firmly gripped and rotated, whereby the pressure of such grip is proportionate to the resistance offered to the rotation of the tube, and whereby the said tube may be simultaneously moved longitudinally without releasing or freeing the grip thereupon in a lateral or circumferential direction.

The object of my invention is to insure a perfect grip on the tube at such time as the same is being rotated, but at the same time to permit always a movement longitudinally of same, to provide for the ready and simple engagement and release of the gripping mechanism, and to simplify the construction of the apparatus and reduce the number of working parts to a minimum.

My invention further consists of certain details of construction and combination of parts, as will be hereinafter more fully set forth.

I will now proceed to describe my invention with reference to the accompanying drawings and will then point out the novel features in claims.

In the drawings, Figure 1 is a top view of an apparatus embodying my invention, a portion thereof being broken away in order to better illustrate the invention. Fig. 2 is a central longitudinal sectional elevation of same, the plane of section being taken upon the line 2 2 of Fig. 1. Fig. 3 is a detail section on the line 3 3 of Fig. 1. Figs. 4, 5, and 6 are details of certain parts.

In the present embodiment of my invention a framework A is provided, upon which is secured an annular bearing-ring A′, recessed on its upper side to form a ball-race. A base-plate A^2 is arranged above said framework, and upon the under side thereof is secured a bearing-ring a', corresponding with ring A′ and having a corresponding ball-race. Balls a^2 are disposed between the two rings, and a ball-bearing is thus provided. The base-plate A^2 has an annular groove a in its upper face, in which is loosely mounted a ring a^3. For purposes of this specification I term this ring a "gripper-ring," and, as here shown, it substantially fits and fills the groove in the said base-plate.

B B designate a plurality of guides which are secured upon the gripper-ring a^3. There may be two or more of these guides. Preferably there will be three, and such number is here shown. Mounted in the said guides are slides b^2, carrying gripper-plates B′, each provided with a gripper-roller b'. The gripper-plates B′ have shanks in which are longitudinal slots and through which bolts pass into the slides b^2, and thereby adjustably attach the said gripper-plates to the said slides. The slides b^2, mounted in the guides B B, are adapted to slide longitudinally therein.

B^2 B^2 designate cams corresponding in number and relative position to said guides, slides, and rollers, and light coil-springs tend at all times to keep the ends of the slides b^2 against the cam-surfaces B^2.

A pawl or latch C is loosely mounted at its lower end in an orifice c in the aforesaid gripper-ring, and the upper end thereof is received within a recess in an arm C′, attached to the main frame A. Teeth c^2 are cut in the lower face of the groove in the base-plate A^2, and the said latch is arranged opposite thereto and at certain times is adapted to engage therewith. A spring c^5 tends to force the latch into engagement with the said teeth, while the latch is normally held out of engagement therewith when the parts are at rest by a shoulder which bears at such time upon a cam-surface or latch-tripper c^3. The

cam-surface c^3 is mounted on the base-plate A^2 and is capable of some slight relative adjustment thereon.

c^4 c^4 designate coil-springs attached at their opposite ends to the gripper-ring and base-plate, respectively.

The under side of the base-plate is provided with a ring of gear-teeth D, and a pinion D' is provided, which meshes with same. The pinion D' is secured upon a drive-shaft d, mounted in bearings upon the framework, and upon this shaft is also secured a drive-sprocket d'.

When it is desired to rotate a tube for the purpose of well-boring or otherwise, power is applied to the sprocket d', and the shaft, and with it the pinion D' thereon, is revolved. This will revolve the base-plate A^2. The pawl or latch C, mounted in the gripper-ring, is held at this time by the stationary arm C' and will hence hold the gripper-ring stationary against the tension of the springs c^4. The cams B^2 advancing will cause the slides b^2 and gripper-rollers b to move inwardly toward the drill-tube, which is centrally disposed within same, until it is gripped thereby. The cam c^3 is so constructed and located that when the said gripper-rollers have firmly gripped the tube the extent of the rotation of the base-plate will be sufficient to release the pawl or latch C from engagement with the arm C', and the spring c^5 will then be permitted to force the said pawl or latch into engagement with the teeth c^2 of the base-plate A^2, and so prevent the gripper-ring from slipping backward relatively of the said base-plate. It is obvious that upon the grippers engaging the tube the greater resistance the tube meets the more the gripper-ring tends to hold back relatively to the base-plate and the tighter becomes the grip upon the tube owing to the tendency of the cams B^2 to drive the grippers inwardly. It will furthermore be seen that the grippers being provided with rollers, as b b, will engage with and lock the tube laterally or circumferentially, while they will not interfere in any manner with the longitudinal movement of the said tube. These gripper-rollers may have a plain curved surface, as shown in Fig. 1, or provided with serrations and teeth, as in detail Fig. 6.

To release the grip upon the tube, it is merely necessary to stop the rotation of the apparatus and to withdraw the pawl or latch C from engagement with the teeth c^2 of the base-plate A^2. The springs c^4 will then cause a relative rotary movement of the ring a^3 and the base-plate A^2, permitting the slides to move down the incline of the cams B^2 and withdrawing the grippers from their engagement with the tube. The apparatus may be reset by revolving the parts until the said pawl or latch is opposite the orifice in the stationary arm C' and in then causing its engagement therewith.

It is obvious that various modifications of the foregoing may be resorted to within the spirit and scope of my invention, and hence I do not desire to be limited only to the precise details of construction and combination of parts herein set forth.

What I claim is—

1. The combination, in an apparatus for rotating tubing or similar objects, of two annular members rotatively mounted with respect to each other, and both adapted to surround the object to be rotated, a plurality of grippers carried by one of said members, and movable thereon, and cams operating upon a relative rotary movement of the two members with respect to each other, to impart an inward movement to the said grippers.

2. The combination, in an apparatus for rotating tubing or similar objects, of two annular members rotatively mounted with respect to each other, and both adapted to surround the object to be rotated, a plurality of grippers carried by one of said members, and movable thereon, and cams operating upon a relative rotary movement of the two members with respect to each other, in either direction, to impart an inward movement to the said grippers.

3. The combination, in an apparatus for rotating tubing or similar objects, of two members rotatively mounted with respect to each other, a plurality of grippers carried by one of said members, and adapted to have a substantially radial movement thereof with respect to its axis of rotation, and cams carried by the other of said members for imparting such radial movement to the said grippers, upon a relative movement of the two members with respect to each other.

4. The combination, in an apparatus for rotating tubing or similar objects, of two members rotatively mounted with respect to each other, a plurality of grippers, carried by one of said members, and adapted to have a substantially radial movement thereof with respect to its axis of rotation, and cams carried by the other of said members for imparting such radial movement to the said grippers, upon a relative movement of the two members with respect to each other in either direction.

5. The combination, in an apparatus for rotating tubing or similar objects, of two members through which the said tubing or other object to be rotated extends, said members rotatively mounted with respect to each other, a plurality of grippers carried by one of said members, and each adapted to have a longitudinal movement in a substantially radial line toward and away from the object to be rotated, and cams carried by the other of said members for imparting such radial movement to the said grippers, upon a relative rotary movement of the two members with respect to each other.

6. The combination, in an apparatus for rotating tubing or similar objects, of a rotatable gripper-ring, a plurality of grippers mounted upon said ring and each adapted to have a longitudinal movement in a substantially radial

line with respect to the axis of rotation of the member carrying it, a rotatable base-plate with respect to which said gripper-ring is adapted to have a limited relative rotary movement, and cams operated by the movement of the base-plate relatively with the gripper-ring, for imparting such substantially radial movement to the grippers.

7. The combination, in an apparatus for rotating tubing or similar objects, of two members rotatively mounted with respect to each other, a plurality of grippers carried by one of said members, and each adapted to have a longitudinal movement in a substantially radial line with respect to the axis of rotation of the member carrying it, and cams carried by the other of said members for imparting such radial movement of the said grippers, upon a relative movement of the two members with respect to each other, together with springs between the two members tending to return them to their normal relative positions.

8. The combination, in an apparatus for rotating tubing or similar objects, of two members rotatively mounted with respect to each other, a plurality of grippers carried by one of said members, and grippers comprising roll-holders and rolls for engaging the object to be rotated, so as to lock the same in a lateral or circumferential direction, but to permit a longitudinal movement of the said tube or other object with respect thereto, each of said grippers adapted to have a longitudinal movement in a substantially radial direction of the member by which they are carried, and cams carried by the other of said members for imparting such radial movement to the said grippers, upon a relative rotary movement of the two members with respect to each other.

9. The combination, in an apparatus for rotating tubing or similar objects, of two members rotatively mounted with respect to each other, a plurality of grippers carried by one of said members, means upon a relative rotary movement of the two members, for operating the said grippers, and a stop for temporarily locking one of the said members against rotation during said relative rotation of the other said member.

10. The combination, in an apparatus for rotating tubing or similar objects, of two members rotatively mounted with respect to each other, a plurality of grippers carried by one of said members, means, upon a relative rotary movement of the two members for operating the said grippers, a stop for temporarily locking one of the said members against rotation during a relative rotation of the other said member, and means for withdrawing the said stop, after the last said member has passed through a limited portion of its movement, to permit the members to rotate together.

11. The combination in a rotating apparatus, of a base-plate and means whereby same may be rotated, a gripper-ring carried by said base-plate but adapted to have a limited relative rotary movement therewith, grippers carried by said gripper-ring, cams on said base-plate adapted to operate said grippers, a spring between said base-plate and said gripper-ring, a ratchet and pawl carried, the one by the base-plate and the other by the gripper-ring, means for holding the gripper-ring during a partial revolution of the base-plate and during the initial operation of the grippers, and whereby the base-plate and gripper-ring are permitted to rotate together after the initial operation of the grippers.

12. The combination in a rotating apparatus, of a plurality of grippers, a gripper-ring upon which said grippers are mounted, a base-plate upon which said gripper-ring is mounted and with which it is adapted to have a limited relative rotary movement, cams upon said base-plate for operating said grippers, a pawl or latch carried by said gripper-ring, teeth upon said base-plate with which said pawl or latch is adapted to engage, a cam on said base-plate adapted to hold said pawl or latch out of engagement with said teeth against spring tension, and a stationary stop in engagement with said pawl or latch and adapted to hold same during a limited movement of the base-plate.

SILAS W. TITUS.

Witnesses:
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HARRY V. GOSS.