

(No. Model.)

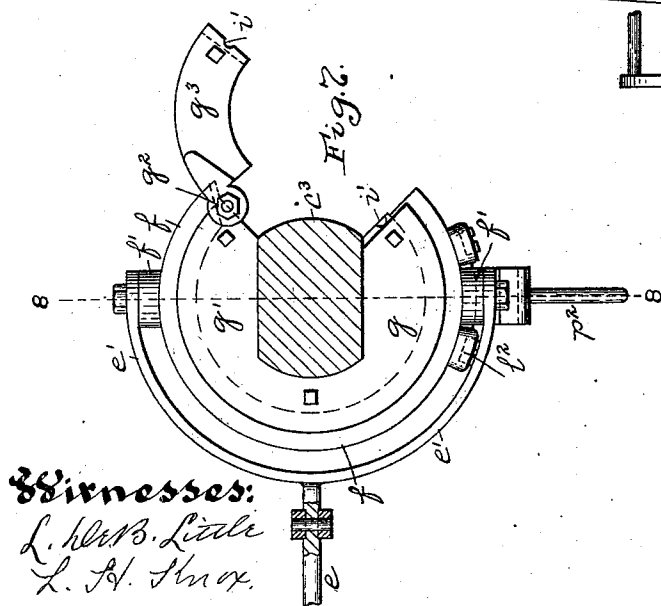
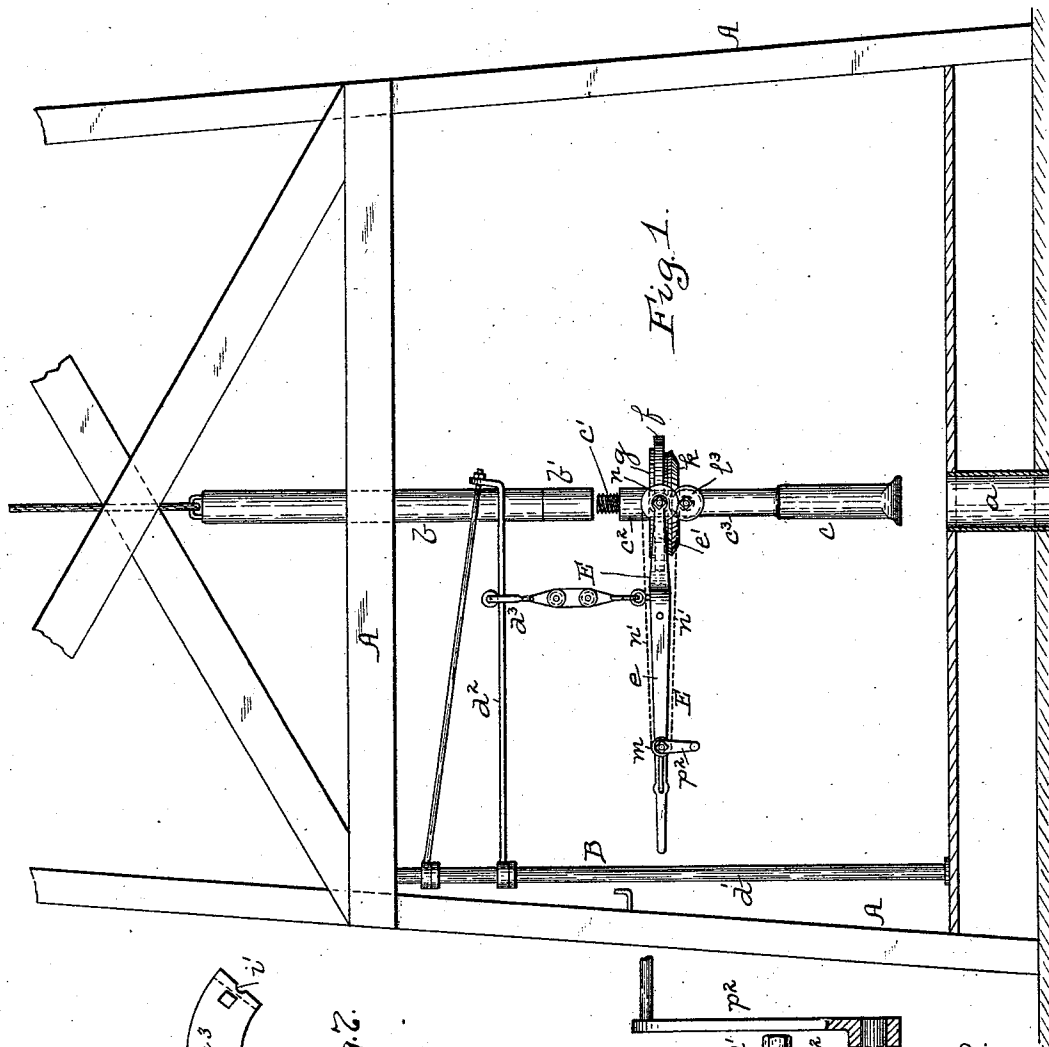
2 Sheets—Sheet 1.

J. BARRETT.

TOOL FOR HANDLING DRILL BITS OR OTHER TOOLS.

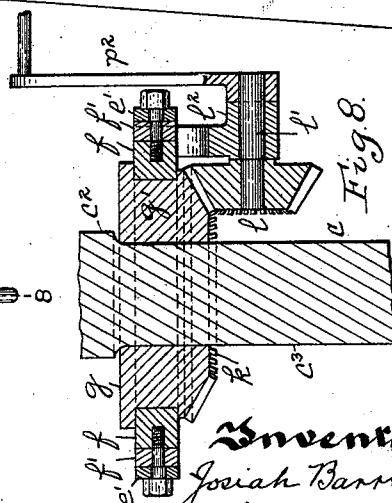
No. 527,103.

Patented Oct. 9, 1894.



Sirnesses:

L. H. B. Little
L. H. Knox.



Inventor
Josiah Barstett.
 By *Ray, Totten & Cooke*
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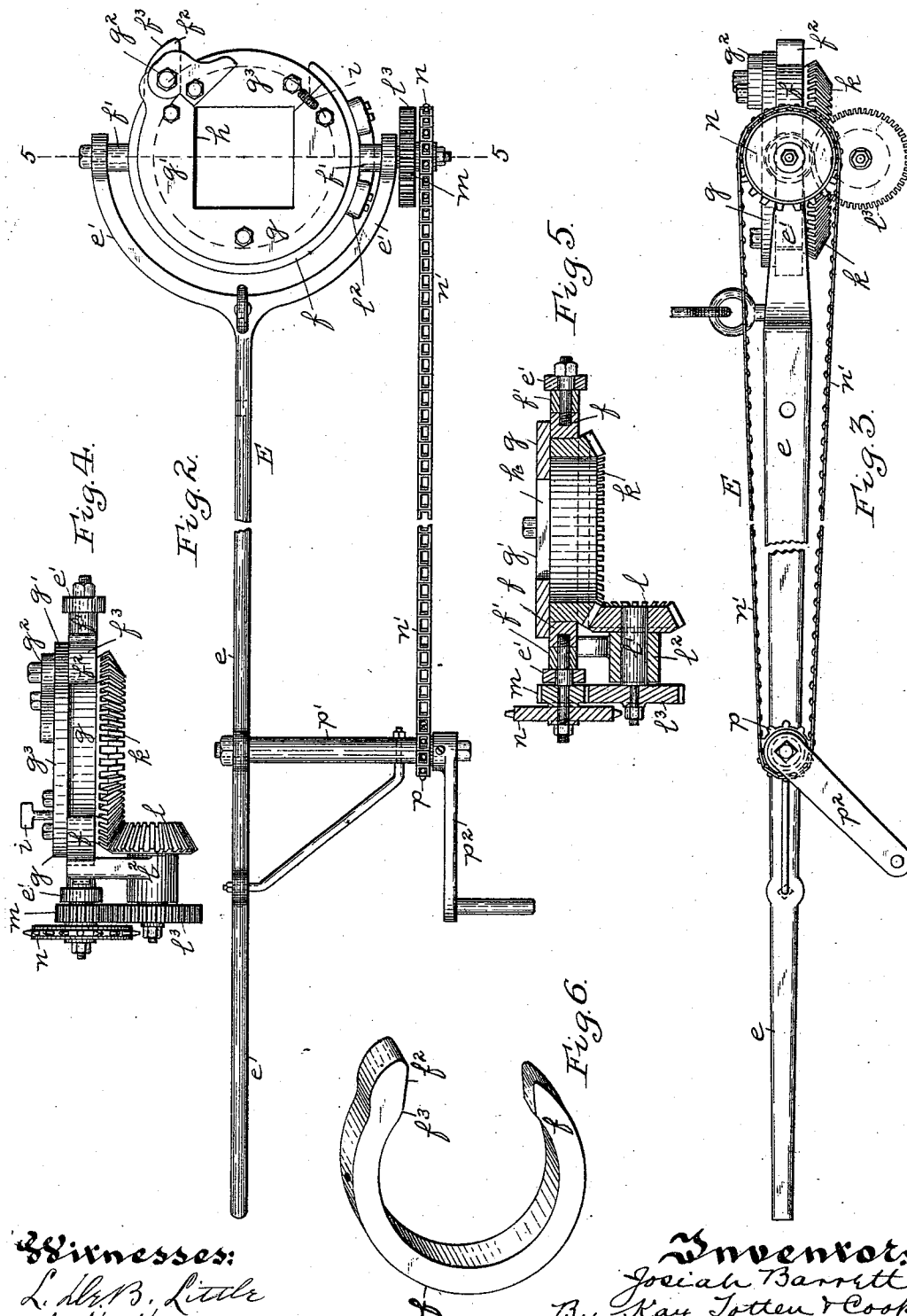
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UNITED STATES PATENT OFFICE.

JOSIAH BARRETT, OF ALLEGHENY, PENNSYLVANIA.

TOOL FOR HANDLING DRILL-BITS OR OTHER TOOLS.

SPECIFICATION forming part of Letters Patent No. 527,103, dated October 9, 1894.

Application filed March 17, 1894. Serial No. 504,030. (No model.)

To all whom it may concern:

Be it known that I, JOSIAH BARRETT, a resident of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Tools for Handling Drill-Bits or other Tools; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to tools for handling drill bits or other tools used in drilling or operating Artesian wells, the handling of casing or tubing employed in such wells, and for like purposes, the tool being also applicable generally to the handling of any heavy parts to be screwed together when in a vertical position whether in connection with Artesian wells or in other mechanical operations.

In the drilling of oil and other Artesian wells a string of tools (in some cases consisting of the drill jars and drilling bits, and in other cases consisting of the drill jars, stem or sinker bar and bit, such as where a heavy line of tools is required) is hung from the drilling rope to which a box or screw socket is secured by a suitable rope clamp, these several tools being connected by screw joints composed of a threaded pin and threaded box or socket on the different tools. The weight of these different tools has so increased in late years that it has become a very difficult matter to handle them in the old way where they were lifted by hand and carried into position to be screwed together, and on account of the increased weight of the tools these operations have become dangerous to the workmen. In the screwing up of the tools it is necessary to insert the pin on the tool, which is generally at its upper end, into the socket or box on the stem or other part, which is suspended from the drilling rope, and to turn the tool so as to screw the pin into the box until the parts are connected in such way that the lowest tool can be lowered into the well and the heavy wrenches placed upon the tools and the tools firmly screwed together by means of a wrenching jack engaging with the wrenches.

The object of the present invention is to provide a swivel wrench by which the tools can be lifted and handled, being carried from the sides of the derrick and brought into

proper position for screwing into the rope socket or the tool hanging therefrom, so as to reduce the labor and the danger of such work and facilitate the work by the employment of mechanical turning devices acting first to insert the pin into the box and support the tool in proper position and turn it so as to screw the pin into the box.

It consists, generally stated, in a lever or carrier suspended from a suitable track, such as from an overhead crane or a stationary track supported in place, and a tool holder adapted to receive the tool in such carrier and hold the same therein and mounted so as to turn within the carrier, and mechanism for turning this tool holder, so that the operator can, by the movement of the lever or carrier, pass the holder around the tool and lift the same thereby to carry it into proper position and insert its pin in the box above the same and turn the tool so as to screw the pin into the box.

It also consists in mounting the tool holder in a ring mounted to swing in the lever, so that the tool holder will always hold the tool in a vertical position, that is, in a proper position for entering the pin into the box.

It also consists in the mechanism employed for turning the tool holder so as to screw the pin into the box or unscrew it therefrom, as well as in certain other improvements which will be hereinafter more particularly set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a view of the lower part of the derrick illustrating the operation of screwing. Fig. 2 is a top or plan view of the wrench. Fig. 3 is a side view of the same. Fig. 4 is a front view. Fig. 5 is a cross section on the line 5—5 Fig. 2. Fig. 6 is a perspective view of the ring removed. Fig. 7 is a plan view of another form of my invention showing the swinging segment open, and Fig. 8 is a cross-section thereof on the line 8—8 Fig. 7.

Like letters of reference indicate like parts in each.

I have illustrated my invention in connection with the screwing of an oil well drilling

bit into the base of the drill jars, as that is the use to which it is most frequently put, and illustrates the general use of the tool whether it is employed for screwing or unscrewing the different oil well drilling tools or for screwing or unscrewing tubing, or for like purposes.

In the drawings A is the derrick, and *a* the casing at the top of the well which is first inserted in the well and through which the drilling operations are subsequently carried on.

b shows the drill jars having the box *b'* at the lower end thereof; *c*, the drilling bit having the pin *c'* at the upper end thereof, the work to be performed being the screwing of the pin *c'* into the box *b'*.

In the derrick A I mount a suitable crane or other track, a crane being shown in the drawings as at B having the standard *d'* and the crane arm *d''* which swings on the standard and which forms the track on which the buggy *d'''* travels and from which the carrier E of the tool forming this invention is suspended, being suspended by any suitable device by means of a chain, block or any other suitable device which can be made vertically adjustable if desired.

The carrier E consists of the frame or lever *e* having at its forward end arms *e'* which extend around and form the bearings for the ring *f* in which the tool holder *g* is mounted to swing, this ring *f* being preferably employed so that even though the lever *e* of the carrier is swung upward and downward to lower or raise the tool, the tool will always be held in a vertical position and in proper position to enter the pin within the socket into which it is to be screwed.

The ring *f* is mounted in the arms *e'* of the carrier by means of bearings *f'* of suitable construction, and swings on said bearings, and it is open at one side, extending for only about three-fourths of a circle, so as to provide for the entrance of the tool *c* into the tool holder *g*. The tool holder is mounted to turn in this ring *f*, having lips extending outwardly and fitting above and below the ring *f*, the tool holder being in this way swiveled within the ring. This tool holder is formed of two parts, the body *g'* formed of about three-fourths of a circle and having in the center thereof a socket *h* which for the handling of the drilling tools is made angular, corresponding to the angular bodies of the drilling tool below the heads thereof, so that when the tool fits within the tool holder it will be suspended therein by its head *c''* resting on the tool holder, and the tool holder will fit around the square or angular portion *c''* below the head and so provide for the turning of the tool. Where tubing is to be handled by the tool, the seats *h* will of course correspond in the proper way to the shape of the tubing, and the tubing can be held from turning within the tool holder by any suitable grip engaging therewith.

At one end of the body *g'* of the tool holder is the hinge *g''* in which is mounted the swinging segment *g'''* of the swiveling tool holder, the outer surface of which corresponds in shape to the outer surface of the body of the tool holder, so that when this swinging segment is closed the segment will turn with the body within the ring *f*, this segment being closed in the manner hereinafter described, and so securing the drilling bit or other tool within the tool holder. The swinging segment of the tool holder is opened to provide for the insertion of the tool within the seat, and as soon as this is done, by the turning of the tool holder this swinging segment is closed, being forced into place by the end of the ring *f* which presses on the outer face of the segment and swings it round, closing it so as to inclose the tool within the same. To cause the easy closing of this tool holder I provide on the ring *f* a lip or extension *f''* which, as the tool is turned, presses against the segment at a point somewhat beyond its hinge and starts the swinging of the segment into place, the segment being gradually closed by this extension *f''* and the curved or tapered face *f'''* on that end of the ring *f*.

For the purpose of locking the segment to the body of the tool holder I employ any suitable device, such as a pin *i* fitting in semi-circular seats or recesses *i'* in the meeting edges of the body *g'* and segment *g'''* of the holder. This locking device is only needed, however, when the tools are being unscrewed, as the natural operation of screwing up holds this segment to place.

For the purpose of turning the tool holder within the ring *f* I may employ any suitable mechanism, the mechanism shown in the main figures of the drawings being as follows: On the lower surface of the tool holder and its segment is formed the bevel geared face *k* which extends below the ring *f* and engages with a bevel pinion *l* mounted on a shaft *l'* in the bracket *l''* secured to and depending from the ring *f*, and at the other side of the shaft *l'* carrying said bevel pinion is a gear wheel *l'''* which meshes with the gear wheel *m* mounted on a pin extending out from one of the arms *e'* of the carrier E. Mounted on the same shaft and rigidly secured to this pinion *m* is the sprocket wheel *n* which is turned by a sprocket chain *n'*, said sprocket chain extending back parallel with the lever *e* and engaging with a sprocket wheel *p* mounted on the side arm *p'* which extends out from the lever *e*, as shown in the plan view. Mounted on this same arm *p'* and rigidly secured to the sprocket wheel *p* is the crank arm *p''* by which the sprocket wheel *p* is turned, and so through the chain *n'* turning the sprocket wheel *n*, and through the gears *m* and *l'''* and bevel pinion *l* meshing with the gear face *k* of the tool holder turning the tool holder within the ring *f*. It will be seen that by means of this gearing the tool holder is driven, no matter what the rela-

tive position of the main frame *e* and ring *f* may be, the ring *f* swinging within the main frame or carrier *E* so as to engage properly with the tool and hold it in a vertical position, and the tool being raised and lowered by the movement of the main frame as it is swung from the crane extending out into the derrick above the same. It will be seen that in this way I provide for the turning of the tool holder from a point near the outer end of the lever *e* so that the operator may apply the full force of the lever in moving the tool and yet have within easy reach the crank for turning the tool holder. I am also enabled to increase the power considerably by the relative sizes of the sprockets and gearing.

The construction above described is considered the most desirable, because I am enabled to handle with it very heavy tools, the drill bits of some of the other tools sometimes weighing as high as a thousand pounds, but for handling lighter tools a shorter lever may be employed and the crank may be applied directly to the shaft extending out from the lever *e*, or to the shaft *l'* carrying the bevel pinion *l*.

In Figs. 7 and 8 I have illustrated the simpler form of apparatus where the crank arm is secured upon the shaft *l'*, power being applied in this case from the crank arm through said shaft *l'* to the bevel pinion *l*, and thence to the gear face *k* of the tool holder *g*.

In the use of the invention when employed for the handling of oil well tools the operation is practically as follows: The tools generally stand around the derrick resting against the walls or frame work thereof in a substantially upright position. When a tool, such as the drilling bit *c*, is to be brought to place and inserted within the socket of the drill jar or other tool, through the drilling rope the tool hanging therefrom is raised to approximately the proper height and the driller then swings the arm of the crane *d* over toward the tool, the swinging segment being open as shown in Fig. 5, and by means of the lever *e* he moves the carriage *d*³ along the track, swinging it thereon and bringing it to such position that he can move forward the front end of the main frame *E* so as to pass the tool holder around the square *c*³ of the drill below the head *c*² of the tool, so bringing the tool into the seat *h* of the rotating tool holder *g*. In this position, by means of the lever *e*, he raises the tool slightly, and then turns the tool holder *g* in such direction that the end of the ring *f* presses against the swinging segment *g*³ of the tool holder, which closes that segment against the body *g'* thereof, and by turning the tool holder carries the segment in such position that it cannot open. He then presses down on the free end of the lever *e*, so raising the drill bit *c*, and by means of the crane and the carrier *E* he carries the drill bit over above the well and inserts the pin *c'* in the drill bit into the box *b'* of the drill jars or stem or other part

hanging from the drill rope. As the rotating tool holder is mounted in the ring *f* which swings in the main frame *E*, the drill bit will of course be held in a vertical position and in proper position to enter the box *b'*, and while he raises the drill bit into that box by pressing downwardly on the outer end of the lever *e*, through the crank lever *p*³ he turns the drill bit and screws the pin *c'* thereof into the box *b'*, screwing it up until the shoulder *c*³ is brought close to or against the box *b'*, the drill being thus brought into proper connection with the box for the wrenching of it to place so as to form a tight joint. He then turns the rotary tool holder *g* so as to bring the swinging segment *g*³ opposite the opening in the ring *f* and draws back on the main frame *E*, which forces the segment *g*³ to swing outwardly by contact with the drill bit and draws the tool holder from the drill bit, when it can, through the movement of the main frame and crane, swing the whole apparatus away from the drill bit. The drill bit can then be screwed tight within the box by lowering the same into the well and applying the ordinary wrenches to the square of the drill bit and of the stem or jars carrying the box *b'*, and by pressure upon the wrenches through the jacking devices the tight joint is formed.

When it is desired to employ the device in removing the drill bit or other such tool, the joint is loosened through the employment of the ordinary wrenches and jacking devices, and the tool holder is then inserted over the square of the drill bit and by turning the tool holder the driller closes the swinging segment *g*³ around the bit, and to hold it closed inserts the pin *i*, above referred to. He then turns the tool in the opposite direction to that of screwing up so as to unscrew its pin *c'* from the box *b'*, and as soon as the drill bit is free, by means of the tool holder and crane, swings it over into proper position against the derrick frame, opens the tool holder *g* and removes the same from the bit.

The above description of the operation illustrates generally how the tool is used. It may be employed in like way for the handling of any suitable tools to be screwed together while in vertical position, whether for oil well or other purposes, and may be employed for handling the ordinary casing or tubing of oil wells, the seat in the block or tool holder *g* being made to correspond to the article to be handled, and any suitable gripping device to hold the same and cause its turning with the block being employed, and as the block *g* is entirely removable from the ring *f* by the simple turning of the same when the swinging segment *g*³ is open, another block having a suitably shaped seat can be inserted therein.

By the use of the invention I am enabled to handle these heavy tools with ease, doing away with all danger to the driller, rendering the operation rapid, so saving time to the driller, which is always of importance, and

reducing the labor to a minimum, while the parts can be made heavy and strong, which is always necessary for well drilling tools.

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

1. The combination of a main frame, a ring mounted to swing therein, and a rotary tool holder swiveled in said ring and having a seat to receive the tool or other article to be handled, substantially as set forth.

2. The combination of a suspended main frame, a ring mounted to swing therein and having an open portion, and a rotary tool holder to turn in said ring and having an open portion and a seat to receive the tool to be handled, substantially as set forth.

3. The combination of a suspended main frame, a ring mounted to swing therein having an open portion, and a rotary tool holder swiveled to turn in said ring, the tool holder being formed of a body portion having an open side, and a swinging segment hinged therein, substantially as set forth.

4. The combination of a main frame, a ring mounted to swing therein a rotary tool holder mounted to turn therein, said tool holder being formed of a body portion and a swinging segment hinged to said body portion, said body portion and segment having geared faces thereon, and gearing engaging with said faces to turn the same, substantially as set forth.

5. The combination of a main frame, a ring mounted to swing therein and having an open portion, and a rotary tool holder mounted to turn in said ring, said tool holder being formed of a body portion and a swinging segment hinged thereto, said segment engaging with the end of the ring so as to close the segment against the body portion, substantially as set forth.

6. The combination of a main frame, a ring mounted to swing therein and having an open portion, and a rotary tool holder mounted to turn in said ring, said tool holder being formed of a body portion and a swinging segment

hinged thereto, said segment engaging with the end of the ring so as to close the segment against the body portion, and said ring having an extension to engage with the outer face of the swinging segment, substantially as set forth.

7. The combination of a main frame, a ring mounted to swing therein, a rotary tool holder mounted in said ring and having a geared face, and a pinion mounted on said ring and engaging with said geared face and acting to turn the tool holder, substantially as set forth.

8. The combination of a main frame, a ring mounted to swing therein, a rotary tool holder mounted to turn in said ring and having a geared face, a shaft carrying a pinion engaging with said geared face, and gearing on the main frame connected to and turning said shaft, substantially as set forth.

9. The combination of a main frame, a ring mounted to swing therein, a rotary tool holder mounted to turn in the ring and having a geared face, a shaft mounted on said ring and carrying a pinion meshing with the geared face and carrying another pinion, and a pinion mounted on the main frame and meshing with and turning the pinion on the shaft, substantially as set forth.

10. The combination of a main frame, a ring mounted to swing therein, a rotary tool holder mounted to turn in said ring and having a geared face, a shaft mounted on the ring and having a pinion engaging with said geared face and carrying a pinion at its outer end, a pinion mounted on the main frame and meshing with said gear pinion, a sprocket wheel rigid with the pinion on the main frame, a sprocket mounted at the outer end of said main frame, and a sprocket chain connecting said sprockets, substantially as set forth.

In testimony whereof I, the said JOSIAH BARRETT, have hereunto set my hand.

JOSIAH BARRETT.

Witnesses:

J. N. COOKE,
L. DEB. LITTLE.