No. 883,265.

PATENTED MAR. 31, 1908.

J. A. WIGGS, Jr.

ROTARY WELL BORING MACHINE.

APPLICATION FILED JULY 22, 1907.

3 SHEETS—SHEET 1.

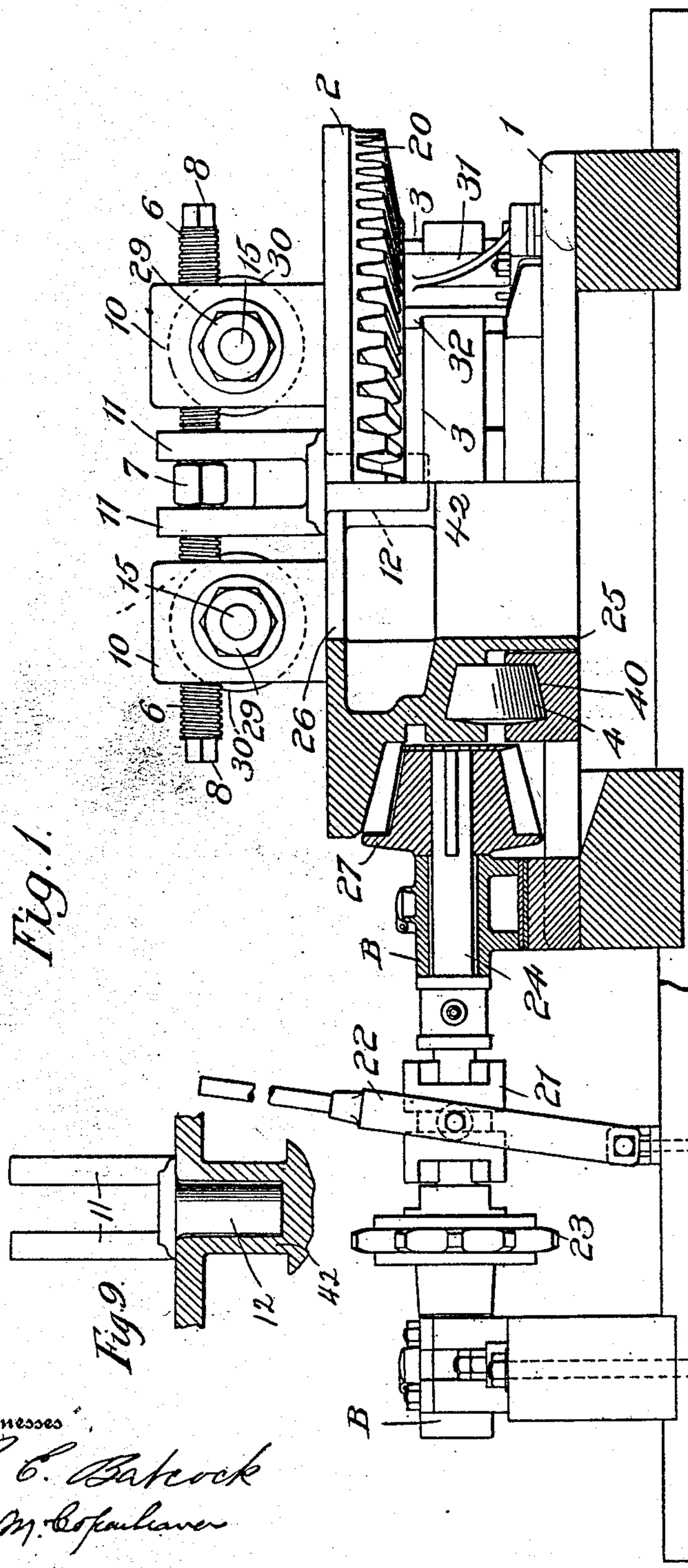

Fig. 1.

Fig. 9.

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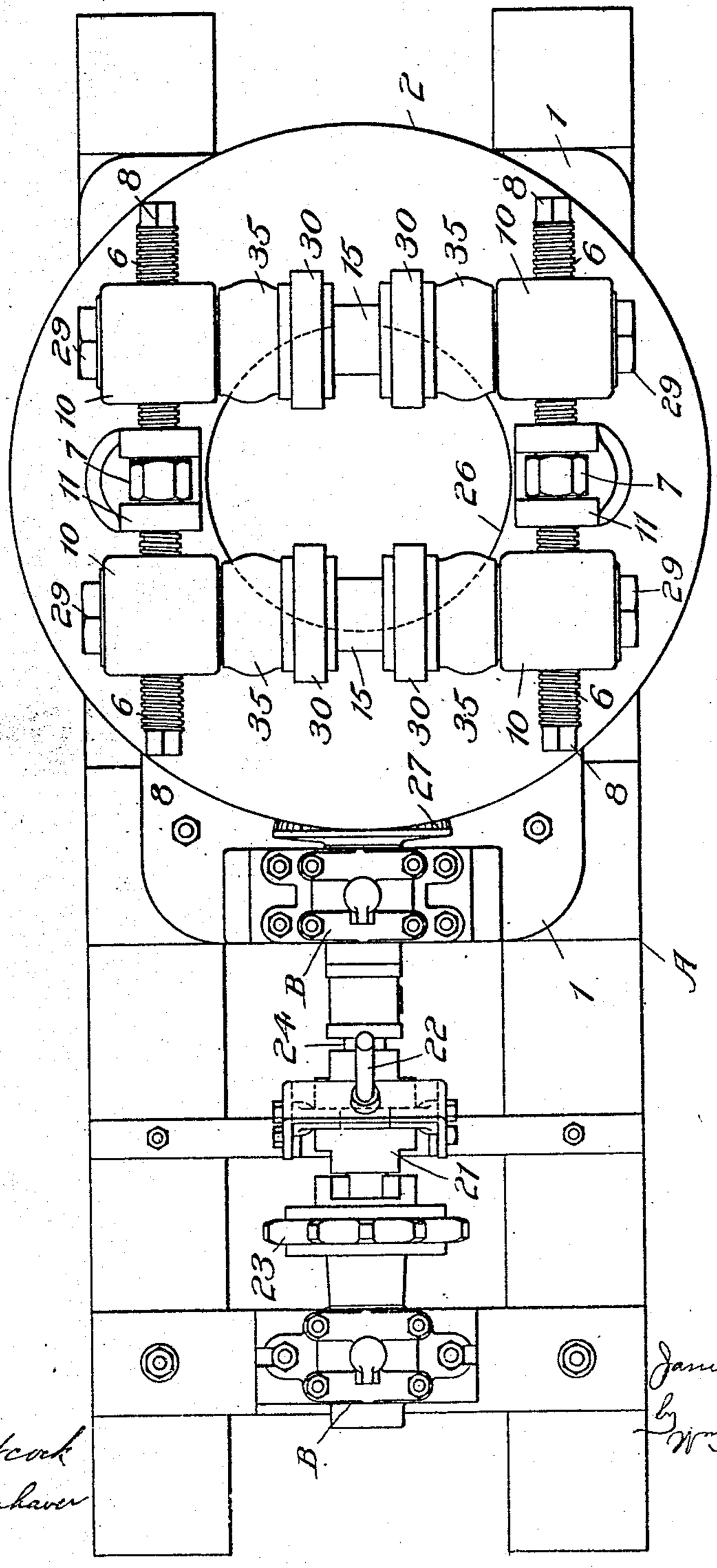
3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

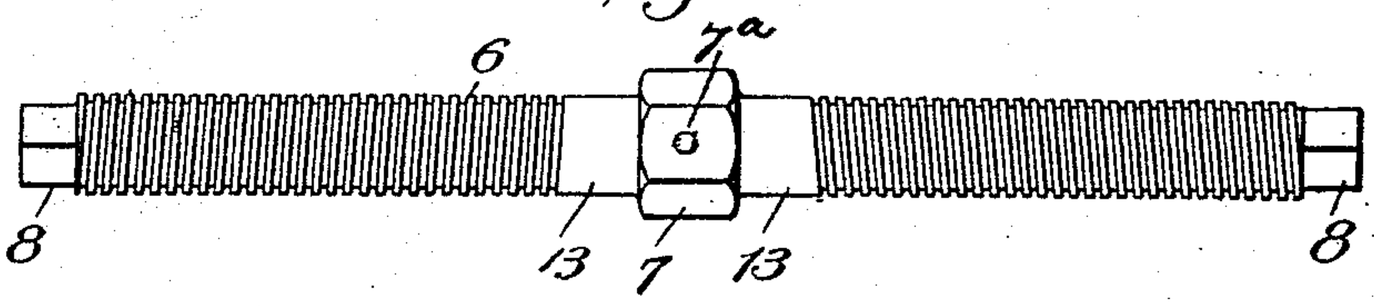


Fig. 4.

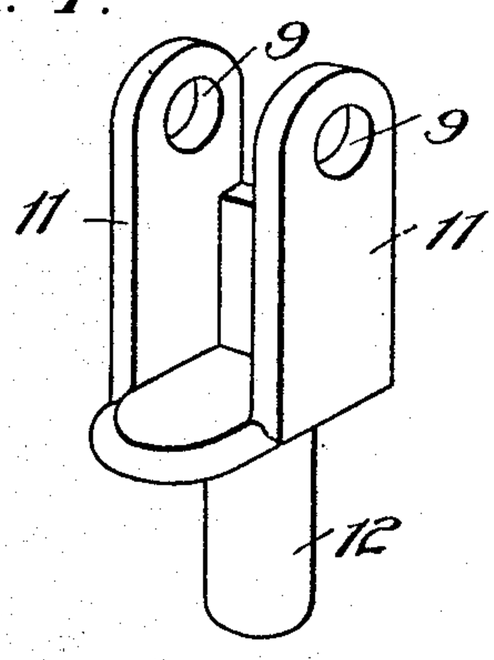


Fig. 5.

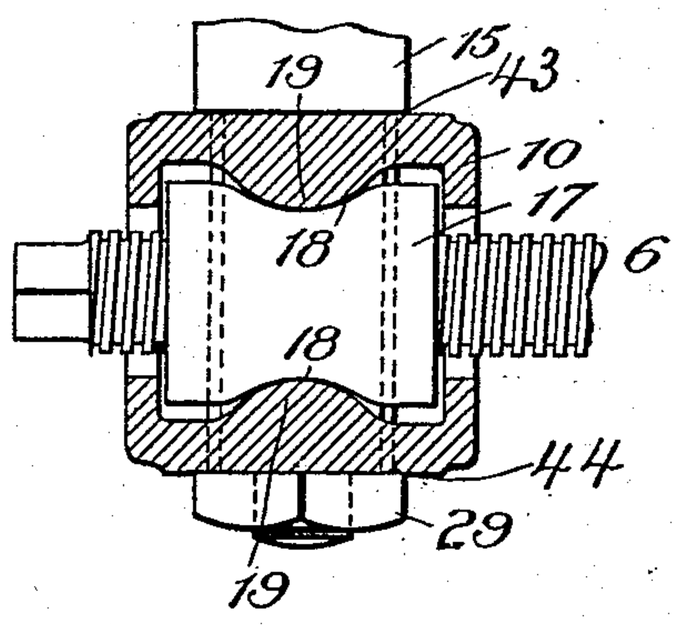


Fig. 6.

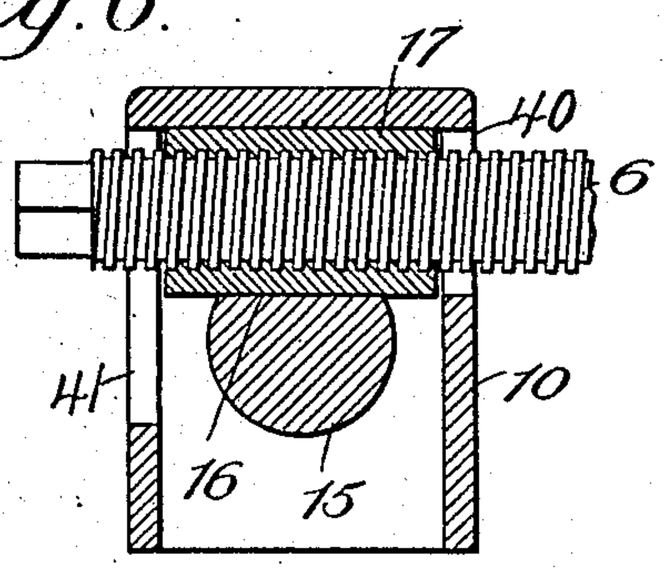


Fig. 7.

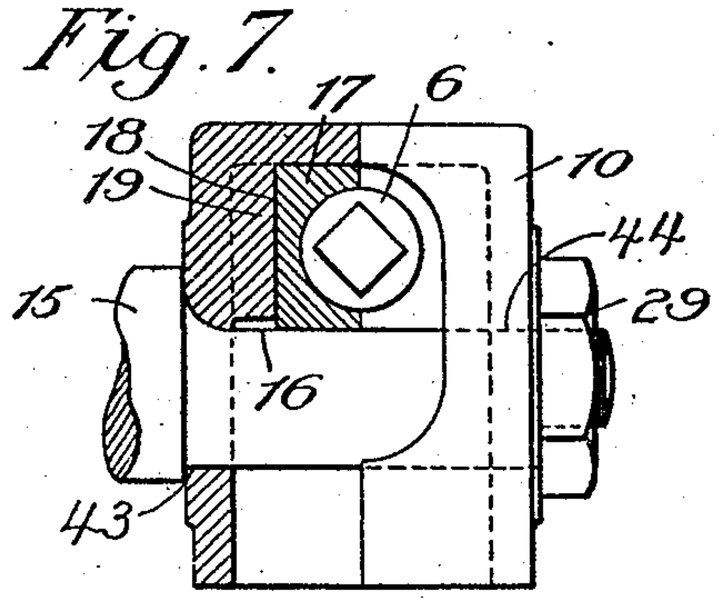
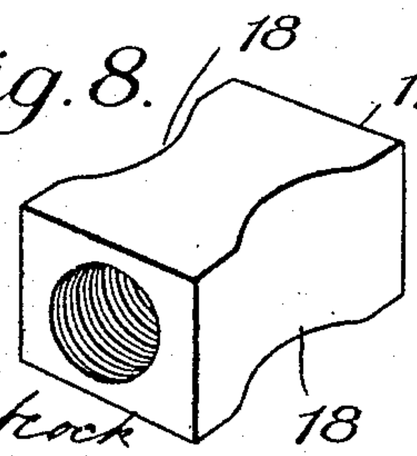


Fig. 8.



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UNITED STATES PATENT OFFICE.

JAMES ALEXANDER WIGGS, JR., OF BEAUMONT, TEXAS.

ROTARY WELL-BORING MACHINE.

No. 883,265. Specification of Letters Patent. Patented March 31, 1908.

Application filed July 22, 1907. Serial No. 385,044.

To all whom it may concern:

Be it known that I, JAMES A. WIGGS, Jr., a citizen of the United States, residing at Beaumont, in the County of Jefferson and State of Texas, have invented certain new and useful Improvements in Rotary Well-Boring Machines; 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 rotary well-boring machines having opposed pairs of gripping rollers on shafts, which are drawn toward each other or moved away from each other at will by right and left screw-threaded shafts and nuts engaging therewith.

In practice it is found very desirable to give a certain flexibility or play to the joints at the corners of the rectangular set of mechanism thus constituted, so that the same may vary toward a rhomboid form, compensating for variations of temperature or inaccurate presentation of the grip rollers to the tube, whatever the cause thereof; thus avoiding needless strain and wear. This is best attained by giving to the nuts above mentioned a curvilinear outline, total or partial, which may be concave as shown, fitting rounded or convex parts of the grip head or grip frame or its appurtenances at the sides of said nut. The nuts are thereby prevented from moving endwise, but will swivel to some extent in a horizontal plane on the curvilinear surfaces aforesaid. They are flattened above and below, and in contact on these faces with flattened parts of the shafts and grip heads, preventing them from tilting up out of their horizontal position or rising in the least.

In the accompanying drawings Figure 1 represents a side elevation partly in vertical section of a machine embodying my invention, the bed frame being partly broken away and the stem of one of the free supports being shown partly in elevation uncovered and partly in dotted lines. Fig. 2 represents a plan view of the same; Fig. 3 represents a detail side elevation of one of the screw-threaded shafts; Fig. 4 represents a detail perspective view of one of the bifurcated supports; Fig. 5 represents a horizontal section through a grip head, showing in plan view the concave-side nut and screw shaft; Fig. 6 represents a vertical section of the same longitudinally through the nut, showing the engaging part of the screw-threaded shaft in elevation; Fig. 7 represents a view at right angles to Fig. 6; Fig. 8 represents a detail perspective view of the concave side nut; and Fig. 9 represents a detail side elevation, enlarged, of one of the supports, the socket or recess for its stem and the proximate part of the table being shown in vertical section.

A designates the bed-frame of the machine, and 1 designates the base plate bolted thereto. Bearings B on said plate and frame support the driving shaft 24, which is provided with a sprocket wheel 23, for receiving motion, and a bevel pinion 27, for transmitting it. Said sprocket wheel is clutched at will to said shaft by a clutch collar 21, worked by shifting lever 22. Said pinion turns with said shaft and rotates the annular table 2 by engaging its cogs 20. Said table has a central opening or bore 26, also a stem 25 turning in a circular opening of plate 1. Said table is supported by anti friction rollers 4, which are located in a raceway 40 formed in the said table and base plate.

The two pairs of tube gripping rollers are free to turn on their shafts 15 known as grip-roller shafts or shafts carrying tube-gripping devices. Washers 35 are arranged between their outer faces and the grip heads 10. These four grip heads are arranged at the corners of the gripping mechanism considered as a whole. The ends of shafts 15 which enter them have flat tops 16.

Two right and left screw threaded adjusting shafts 6 enter said grip heads at right angles to shafts 15 and engage nuts 17 within the same, which nuts are flattened at the top and bottom to fit in each instance against the underside of the top of the grip head and the flat top 16 of the shaft 15 below said nut. In consequence the nut cannot rise bodily nor be tilted up. The sides of each nut are provided with concavities 18, receiving convex parts 19 of the grip head, this engagement preventing all endwise movement of said nut but allowing it to swivel moderately in a horizontal plane for the purposes hereinbefore explained.

Each screw threaded shaft 6 has a central prismatic part 7 for convenience of gripping and turning it, also terminal prismatic parts 8 that may be similarly utilized. Part 7 is arranged between cylindrical parts 13 of said shaft, journaled in bearing holes 9 in the upper ends of a bifurcated support 11, having a downward stem 12 set freely into a recess 42

in the top of said table. The two supports 11, arranged opposite each other, rise with the entire gripping mechanism when sufficiently jarred upward, leaping out of their sockets and leaving the top of the table smooth as explained in my application No. 310943. The prismatic part 7 is preferably not integral with the said screw-shaft, but fastened thereto by the rivet 7ª, after passing the said shaft through the openings *g* and the bore of said nut, until the middle point of the shaft is under the middle of the space between the bifurcations of support 11, which space is occupied by said prismatic part. The said shafts 6 act, as usual, to draw the shafts 15 together and close the gripping rollers on the boring tube or rod, or to move shafts 15 and their rollers away from each other, releasing said tube; according to the direction in which shafts 6 are turned. Said table is detachably fastened to base plate 1 by frames or castings 31, adjustable on said plate to move their projecting parts 32 into or out of annular groove 3 of the reduced part of said table below the cog-teeth, as shown in both the prior applications hereinbefore mentioned.

Each grip-head 10 is in one piece and constitutes an approximately rectangular shell, which is open at the bottom, closed at the top and has a hollow interior. Two of its sides, opposite each other, are provided with openings 40 and 41, immediately under said closed top for the passage of screw-threaded shaft 6 through said grip-head, the opening 41 extending much lower than opening 40. The nut 17 (Figs. 5, 6, 7, and 8) is arranged in line as to its length with opening 40 and the upper part of opening 41. The screw-tapped longitudinal bore of said nut of course receives the said screw-shaft. The before described convex inwardly projecting parts 19 (Fig. 5) are on the other two sides of the grip head 10, to fit the lateral concavities 18 of said nut.

The two sides last mentioned of said grip-head are provided with openings 43 and 44 (Figs. 5 and 7) opposite each other for the reception of the reduced and flattened end of the roller carrying shaft 15 proximate to the shaft 6 aforesaid, the location of these openings being lower than opening 40 and nut 17 in order that the flat top 16 of this part of shaft 15 may fit against the under side of said nut while the flat top of this nut fits against the flat under side of the top of the grip-head, so that said nut is locked securely against tilting or turning and the shaft is locked against turning on its axis. In assembling these parts within the grip-head 10, the nut 17 may be first introduced, then the shaft 15 at right angles thereto and under the same. Then the exterior nut 29 may be turned home on the protruding screw-threaded end of shaft 15 and against said grip-head as shown in Fig. 7. Then the shaft 6 may be screwed through the nut 17. The downward extension of opening 41 (Fig. 6) and the open construction of the bottom of said casing will facilitate the above operation or any other convenient order of assemblage. The openings 40, 41, 43 and 44 are wide enough to permit the slight swiveling motion of the grip-head in a horizontal plane as hereinbefore described when the convex parts 19 of said grip-head rock horizontally on the concave parts 18 of the nut and the shafts 6 and 15 are not permitted to obstruct such motion. As there is one of these grip-heads at each corner of the normally rectangular series of gripping mechanism comprising the two roller-carrying shafts 15, this construction and adaptation provide a certain amount of flexibility at each of said corners, so that in practical use the said rectangular series of gripping mechanism may yield at need assuming a somewhat rhomboid shape, and permitting the gripping rollers to be presented to the boring rod or tube evenly and in the best position for effective grip thereon, not withstanding any slight change of form or position in any of the shafts which may be due to change of temperature, strain or jar. This feature of the flexible automatic compensation and adjustment is found practically of very great importance and value.

When the four shafts, the four grip-heads and the four nuts 17 spring up together with the supports 11 under the influence of a sudden jar as before described, such upward motion will seldom be quite even and vertical at all points and the laterally swiveling action at the corners has an especial value in guarding against the effect of oblique upward strain.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a rotary well-boring machine tube-gripping mechanism, comprising shafts carrying tube gripping devices and adjusting shafts and having normally a quadrilateral form as a whole, but provided at its corners with nuts having concave sides and contiguous parts having convex faces fitting said sides, the said parts connecting the ends of said shafts to each other and allowing horizontal flexure for the purpose set forth.

2. In a rotary well boring machine, tube-gripping mechanism comprising two shafts carrying tube gripping devices, two screw-threaded adjusting shafts for the same, four grip heads arranged at the corners of the system of mechanism thus formed and nuts within said grip heads receiving said screw-threaded shaft and locked against vertical or endwise movement, the said nuts and grip-heads being provided with curvilinear parts in contact within each other, whereby they are adapted to swivel slightly in a horizontal plane for the purpose set forth.

3. In a rotary well boring machine, a pair of shafts carrying tube-gripping devices, in combination with screw-threaded shafts for adjusting said grip-roller shafts, nuts engaging said screw-threaded shafts and hollow grip-heads inclosing said nuts and connecting the proximate ends of said grip-roller shafts and screw-threaded shafts, the said nuts having concavities in their sides and the said grip-heads having convex parts which fit into said concavities, to permit a swiveling action of the nuts and grip-heads in a horizontal plane substantially as set forth.

4. In a rotary well-boring machine, a pair of shafts carrying tube-gripping devices having flattened faces, in combination with screw-threaded shafts for adjusting said grip-roller shafts, nuts on said grip roller shafts having flattened faces in contact with the similar faces of said shafts but provided with curvilinear sides, and grip heads which hold said nuts in contact with such shaft faces but allow said nuts to swivel in a horizontal plane substantially as set forth.

5. A nut provided with concave surfaces in its sides but flat on top and below, in combination with a screw threaded adjusting shaft engaging said nut, a shaft carrying a tube-gripping device having a flat face on top and a hollow grip head provided with inwardly facing convex parts fitting said concave parts of the sides of the nut and holding the lower face of the latter in contact with the flattened face of the shaft substantially as set forth.

6. In rotary well-boring machines, the combination of a pair of shafts carrying tube-gripping devices and a pair of screw-threaded shafts for adjusting them toward and from each other, with a hollow grip-head connecting the proximate ends of said shafts, nuts engaging the latter shaft and having curvilinear side-faces adapted to permit swiveling in a horizontal plane and means for holding said nuts against upward or endwise motion, with relation to said grip-head though permitting such swiveling action substantially as set forth.

7. In rotary well-boring machines, tube-gripping mechanism normally quadrilateral in form and provided at the corners with nuts having concave sides, and with devices having convex parts fitting such concavities for swiveling to slightly change such form, in combination with a rotary table, having sockets in its upper face, and supports for such mechanism having stems which set freely into said sockets, permitting said supports to spring with the mechanism above the table substantially as set forth.

8. In a rotary well-boring machine, tube-gripping mechanism, comprising shafts carrying tube-gripping devices and screw threaded adjusting shafts and having approximately a quadrilateral form as a whole, but provided at its corners with nuts for said adjusting shafts, having concavities in their sides and with contiguous parts fitting said concavities to permit horizontal flexure, the said nuts and contiguous parts serving to flexibly connect the ends of the roller-carrying shafts to the ends of the adjusting shafts for allowing the tube gripping mechanism as a whole to vary slightly from the quadrilateral form substantially as set forth.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES ALEXANDER WIGGS, JR.

Witnesses:

CHARLES H. SMITH,

BENJAMINE G. NEVILLÉ.