C. BELL.

ROTARY DRILLING RIG.

APPLICATION FILED JUNE 13, 1910.

997,035. **Patented July 4, 1911.**

Fig. 1.

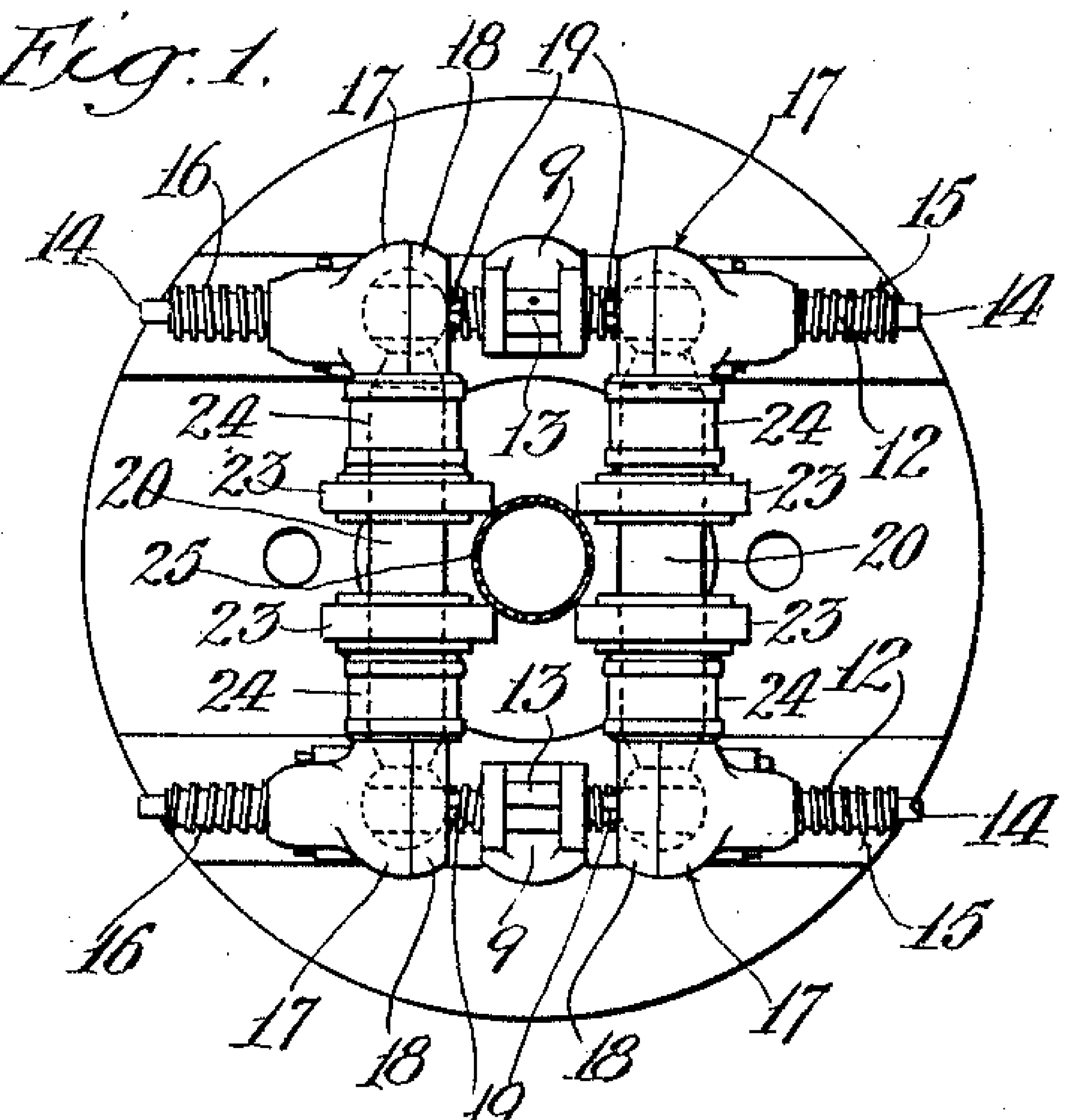


Fig. 4.

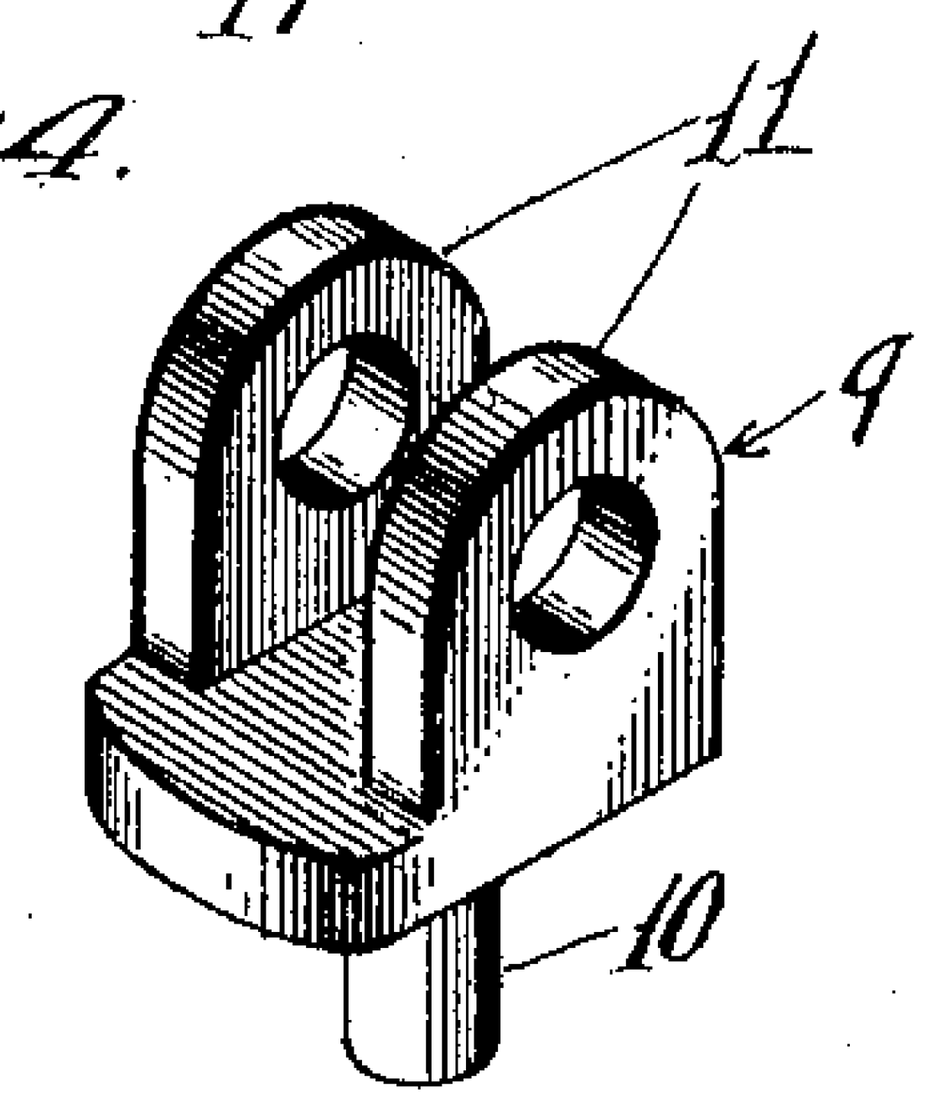


Fig. 3.

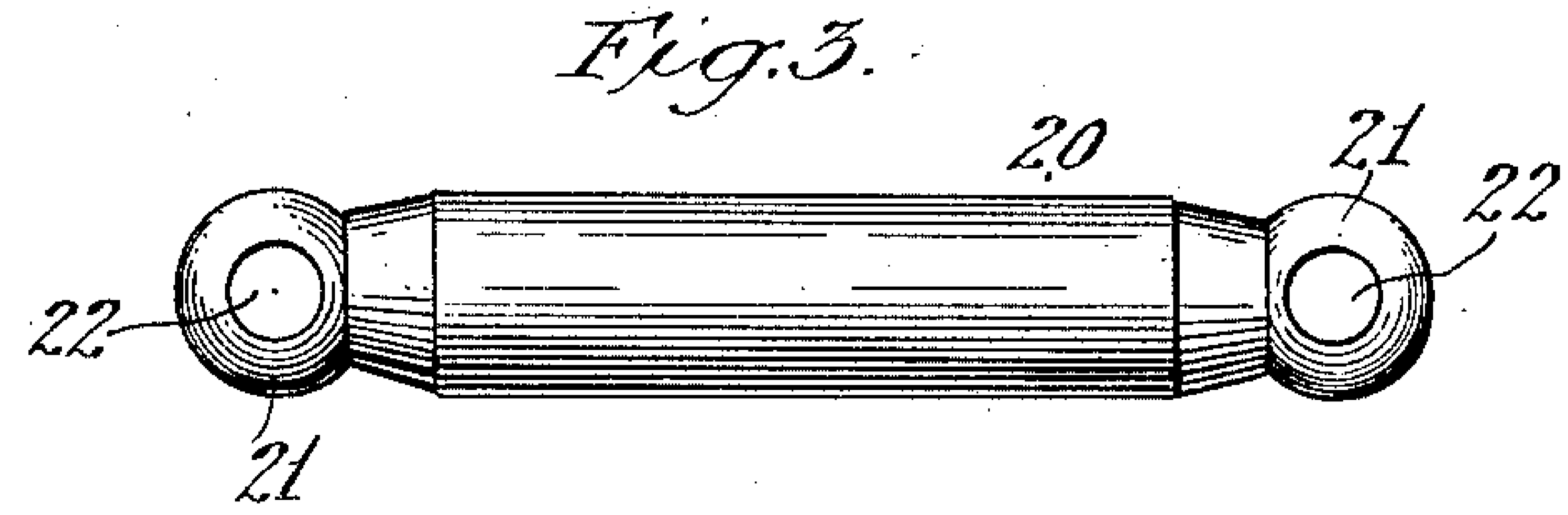
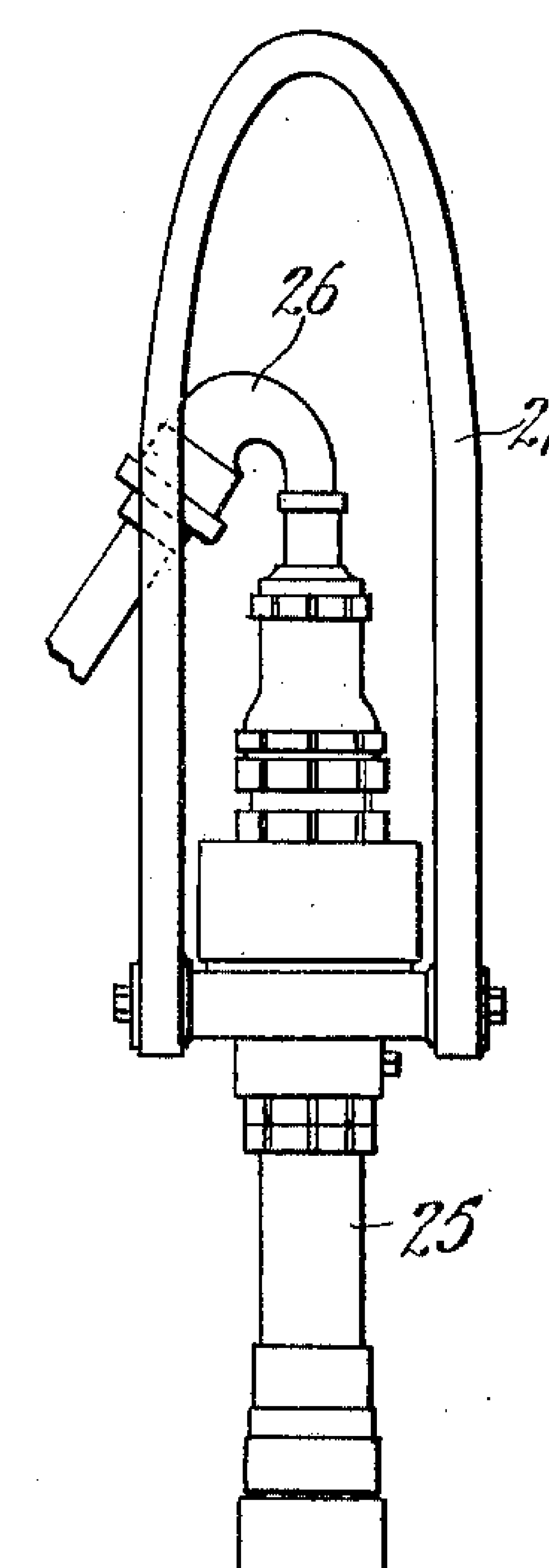
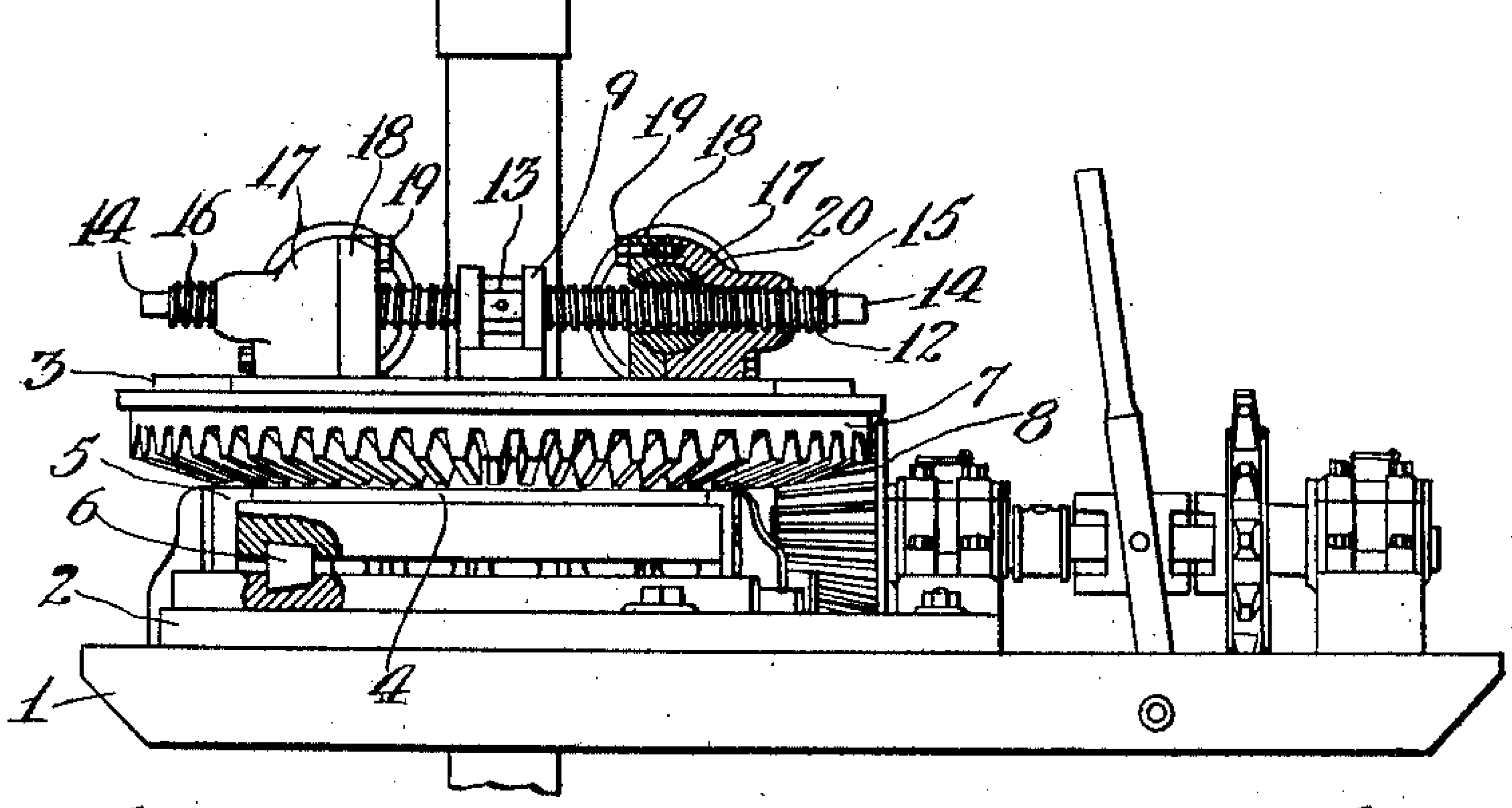


Fig 2





Witnesses:–
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UNITED STATES PATENT OFFICE.

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ROTARY DRILLING-RIG.

997,035. Specification of Letters Patent. **Patented July 4, 1911.**

Application filed June 13, 1910. Serial No. 566,868.

To all whom it may concern:

Be it known that I, CYRUS BELL, a citizen of the United States, residing at Taft, in the county of Kern and State of California, have invented new and useful Improvements in Rotary Drilling-Rigs, of which the following is a specification.

This invention relates to improvements in rotary drilling rigs and pertains especially to the construction of the grip ring mandrels and their support.

Considerable difficulty is encountered in a frequent breakage of the adjusting screws, the break generally occurring at or near the point where they pass through the adjusting screw post, the breakage being due to a wabbling action of the casing due to its inequality in size or varying shape, which acting through the grip rings strains the grip ring mandrels and the latter acting through the grip heads strain the adjusting screws and cause them to break.

The main object of the present invention is to avoid this by so constructing and mounting the grip ring mandrels that they will be permitted a certain flexibility of movement at their points of support which will not affect the grip heads, the latter being allowed to rest naturally or float on the upper surface of the table in perfect alinement with the natural direction of the adjusting screws which are screwed in the grip heads.

Referring to the drawings: Figure 1 is a plan view of the table portion of the rotary rig constructed in accordance with my invention, a casing being shown in section in position between the grip rings. Fig. 2 is a side elevation, partly in section, of the table mechanism and clutch mechanism, showing the loose bail swivel connected to the upper end of the casing. Fig. 3 is a side elevation in detail of one of the grip ring mandrels. Fig. 4 is a perspective in detail of a grip head.

1 designates the frame on which is mounted the base 2, on which is the rotary gear table 3 formed with a groove 4 engaged by knee posts 5 which hold the table from jumping up. In order to prevent thrust friction, the gear table 3 rides on the cones 6. The gear table 3 is provided with gear 7 driven by bevel pinion 8, the latter being operated by well known clutch mechanism. Mounted on the upper face of the gear table 3 are two adjusting screw posts 9, shown in detail in Fig. 4, each adjusting screw post 9 having a pin 10 which is swiveled in the gear table 3, each adjusting screw post having two flanges 11 through which extends an adjusting screw 12, the latter being rotatable in the flanges 11 and having a hexagonal portion 13 between the flanges, whereby the screw may easily be turned and which also acts to hold the screw from longitudinal movement. The outer ends of each screw are also squared at 14 to receive a wrench. Each adjusting screw is made with right hand threads 15 and left hand threads 16, and each end of each adjusting screw is screwed in a grip head 17 which rests or floats on the upper face of the gear table 3, not being secured thereto but being perfectly free to slide in any direction thereon. Each grip head 17 is provided with a plate 18, the latter being secured thereto by cap screws 19 and the plate and grip head are respectively provided with substantially hemispherical recesses which together form substantially a spherical cavity and the adjusting screw 12 passes through the center of such cavity.

Extending at right angles to the adjusting screws 12 are two grip ring mandrels 20, a mandrel being shown in detail in Fig. 3. Each grip ring mandrel 20 is formed with a spherical end 21 which is located in the spherical cavity before referred to formed within the grip head 17 and plate 18, and each spherical end 21 is formed with a diametrical bore 22 through which the adjusting screw 12 freely passes, as clearly shown in Fig. 2. Mounted on each grip ring mandrel 20 are two grip rings 23 and alining washers 24.

25 designates the casing which extends down between the grip rings 23, and 27 designates the loose bail swivel, and 26 the goose neck.

The spherical ends of the grip ring mandrels which lie in the spherical cavities in the grip heads permit a certain flexibility in all directions between the grip ring mandrels and the grip heads, so that even though the casing for one reason or another causes more or less bodily movement of the grip rings in addition to the rotary movement of the latter, this bodily motion of the grip rings does not move the grip heads out of alinement or cause them to cramp or bend

the adjusting screws laterally, and it is this bending motion of the screws which the present invention avoids and which in previous constructions caused the breaking of the adjusting screws. It should be understood that the grip heads rest loosely or float upon the upper surface of the gear table, so that there is no force exerted upon the grip heads which will move them in any direction out of perfect alinement with the adjusting screws. The screws may be turned in either direction to move the adjusting heads toward or from the casing to tighten or loosen the pressure of the grip rings against the casing, but the only strain exerted against the grip heads is a strain in direct line with the axis of the adjusting screw.

What I claim is:

1. In a rotary drilling rig, grip rings adapted to grip the casing, mandrels carrying the grip rings, adjusting screws extending diametrically and loosely through the ends of the mandrels for moving the mandrels and grip rings toward or from the casing, and grip heads flexibly connected with the mandrels and in threaded engagement with the adjusting screws, whereby the grip rings are allowed to have a varying movement imparted to them from the casing without straining the adjusting screws.

2. In a rotary drilling rig, a gear table, grip ring mandrels, grip rings on the grip ring mandrels adapted to grip the casing, grip heads floating on the gear table, adjusting screws passing diametrically through the ends of the mandrels for adjusting the grip heads toward and from the casing.

3. In a rotary drilling rig, a rotary table, grip heads resting on the upper surface thereof and freely slidable thereon, an adjusting screw with right and left threads screwed through each pair of grip heads, means on the gear table preventing longitudinal movement of each adjusting screw, grip ring mandrels at right angles to the adjusting screws, each grip ring mandrel having its end connected with a ball and socket joint to the associated grip head, the ball end of each grip ring mandrel being coincident with the axis of the mandrel and having a diametrical bore through which the adjacent end of the adjusting screw freely passes, and grip rings on each grip ring mandrel.

4. In a rotary drilling rig, a gear table, grip heads resting on the upper face thereof and slidable freely thereon, adjusting screw posts each having a pin swiveled in the gear table, an adjusting screw with its central portion journaled in an adjusting screw post, each end of each adjusting screw being screwed in a grip head, a plate secured to each grip head, each plate and grip head having a hemispherical recess, which together form substantially a spherical cavity, the adjusting screw passing loosely through the plate and diametrically through said cavity, grip ring mandrels extending at right angles to the adjusting screws, each grip ring mandrel having a spherical end located substantially co-incident with the axis of said mandrel and mounted in the cavity in a grip head, each spherical end having a diametrical bore through which the adjusting screw loosely passes, and grip rings on the grip ring mandrels.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 4th day of June, 1910.

CYRUS BELL.

In presence of—
G. T. HACKLEY,
FRANK L. A. GRAHAM.