

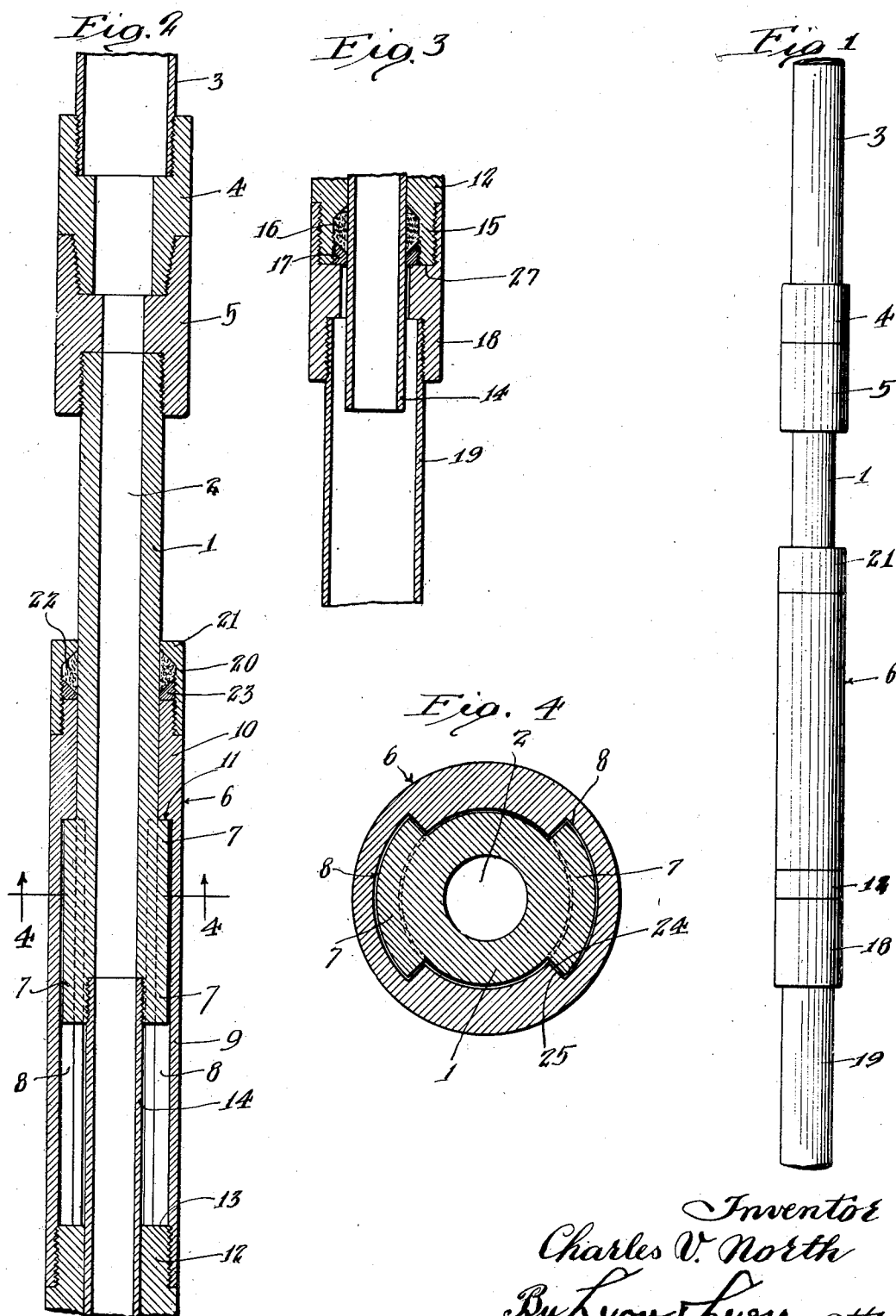
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ROTARY JAR

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UNITED STATES PATENT OFFICE.

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ROTARY JAR.

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This invention relates to rotary jars such as used in drilling oil wells or any like operation. The general object of the invention is to produce a jar having simple means for enabling water to be carried through the jar to the tool at the bottom of the well, and having means for effectively packing the jar to prevent loss of the water; also to provide a jar which will have a construction enabling it to effectively resist the blows in jarring, and impart the rotary movement from the rotary device at the mouth of the well to the tool at the bottom of the well. Further objects of the invention will appear herein-after.

The invention consists in the novel parts and combination of parts to be described hereinafter, all of which contribute to produce an efficient rotary jar.

A preferred embodiment of the invention is described in the following specification while the broad scope of the invention is pointed out in the appended claims.

Of the drawings:

Figure 1 is a side elevation of the rotary jar showing a portion of the upper string of pipe and a portion of the lower string of pipe broken away.

Fig. 2 is a vertical section through the upper portion of the jar and showing the connection of the upper end of the plunger to the lower end of the pipe string which leads upwardly to the rotary device; the lower portion of the jar in this view is broken away.

Fig. 3 is a view similar to Figure 2 showing the lower portion of the jar together with a short portion of the pipe string which is connected with the bit or other tool at the bottom of the well.

Fig. 4 is a cross section on the line 4-4 of Figure 2 upon an enlarged scale and further illustrating details of the jar device.

The rotary jar comprises a plunger 1 which has a neck at its upper end of circular cross-section, and is of tubular form so that it presents a bore 2 to carry water downwardly from the upper piping 3 which is connected above to the rotary device; this plunger is connected by a joint 4 and a plunger cap 5 with the upper end of the plunger. I also provide a barrel 6 which cooperates with the plunger in the jarring movement. For this purpose the plunger and barrel have interlocking means, that is to say, one of the parts carries a lug and the

other carries a recess to cooperate with the lug to enable a rotary movement to be imparted through the jar as well as the jarring movement. For this purpose I provide the lower end of the plunger with lug means, preferably in the form of two diametrically opposite lugs 7 which are received in two diametrically opposite recesses, grooves or slots 8, which are cut longitudinally in the inner face of the shell 9 of the barrel which extends down from the upper head of the barrel, the said upper head being integral with the shell. In this way a shoulder 11 is formed on each side of the plunger which will be engaged by its corresponding lug 7 enabling an upward jar movement to be delivered to the barrel. The slots 8 extend all the way to the lower end of the shell 9 and at the bottom of the shell I provide a removable plug 12 which may be threaded into the shell, see Figure 2, and this plug operates as a lower head for the barrel, retaining the plunger and presenting its upper face 13 in the path of the lugs 7 so as to be engaged by the lugs in the downward jarring movement.

The recesses or grooves 8 and the lugs 7 are preferably of dove tail form so that they will fit together, see Figure 4.

I provide means for packing the plunger at the upper and lower end of the barrel. For this purpose the plunger includes a tail pipe 14 having a cylindrical outer face; this tail pipe is secured in the lower end of the body of the plunger so as to communicate with the bore of the plunger and cooperate with this bore to carry down the circulating water. This tail pipe extends downwardly through the lower head 12, which has a circular central opening to guide it. The lower head is provided with a stuffing box 15 carrying suitable packing 16 held in place by a gland ring 17 which is threaded in the wall of the stuffing box and which may be screwed in by means of a spanner wrench. The lower end of the head 12 has a coupling 18 screwed onto it and the lower end of this coupling 18 connects with the pipe string 19 which extends down to the rotary tool at the bottom of the well.

The upper end of the barrel is provided with a stuffing box 20 which is formed in a nut 21 having screw connection with the upper end of the plunger, and the packing 22 in this stuffing box is squeezed by a gland ring 23 similar to the gland ring 17 and is

screwed tight in the stuffing box by means of a spanner wrench.

It will be evident that a rotary jar embodying my invention enables the rotary movement to be imparted from the side faces 24 of the lugs to the side faces 25 of the slots or recesses 8. Furthermore the length of the lugs 7 is about half the length of the slots or recesses 8 and this enables an effective jarring movement to be imparted from the plunger to the barrel either in an upward direction or a downward direction. When the coupling 18 is screwed up tight its upper face 27 seats against the lower end of the lower head 12 so that the jarring movement is not imparted through the thread connection but directly from the head 12 to the coupling 18.

It will also be evident that the construction of the jar enables water to be carried through it at all times whenever desired to deliver the same to the tool at the lower end of the well.

The form of the plug 12 especially is adapted for receiving the blow from the jar; in other words, the opening through it is round so that there are no angles where a crack would tend to start.

It is understood that the embodiment of the invention described herein is only one of the many embodiments this invention may take and I do not wish to be limited in the practice of my invention nor in my claims to the particular embodiment set forth.

Features of my improvement may be applied to a jar regardless of whether it is a rotary jar or not.

It will be noted that in the operation of this tool, the lugs 7 are in constant engagement with the side faces 25 of the grooves or slots 8 in which they run.

I claim:

1. In a rotary jar, the combination of a barrel having a head at its lower end, with means for attaching the head to a tool string, and having a head at its upper end, a tubular plunger having a neck of circular cross-section at its upper end mounted to

slide up and down through the last named head, said plunger being movable up and down in the barrel with equal freedom, said plunger and barrel having interlocking means consisting of a lug on one of the parts and a recess on the other part having a side face in constant contact with the lug and cooperating with the lug to enable the plunger to impart rotary movement to the barrel in any position of the plunger in the barrel, said lug being capable of striking either of said heads to impart a jar from the plunger to the barrel, means for packing the circular neck of said plunger at the upper head, and means for packing the plunger at the lower head.

2. In a rotary jar, the combination of a barrel having a head at its lower end, with means for attaching the head to a tool string, and having a head at its upper end, a tubular plunger having a neck of circular cross-section at its upper end mounted to slide up and down through the last named head, said plunger being movable up and down in the barrel with equal freedom, and having oppositely disposed lugs, said barrel having oppositely disposed recesses receiving the lugs and cooperating with the same to enable the plunger to impart rotary movement to the barrel, the said lugs being shorter than their recesses, to enable the plunger to be moved up and down so that the lugs strike the ends of the recesses to impart a jar from the plunger to the barrel, a stuffing box in the upper head with packing for the cylindrical neck, said plunger having a tail pipe communicating with the bore of the tube of the plunger and cooperating with the same to conduct water through the jar, said tail-pipe extending through the lower head of the barrel and having a cylindrical outer face, and a stuffing box at the lower head for packing the tail pipe.

Signed at Los Angeles, California, this 13th day of November, 1922.

CHARLES V. NORTH.