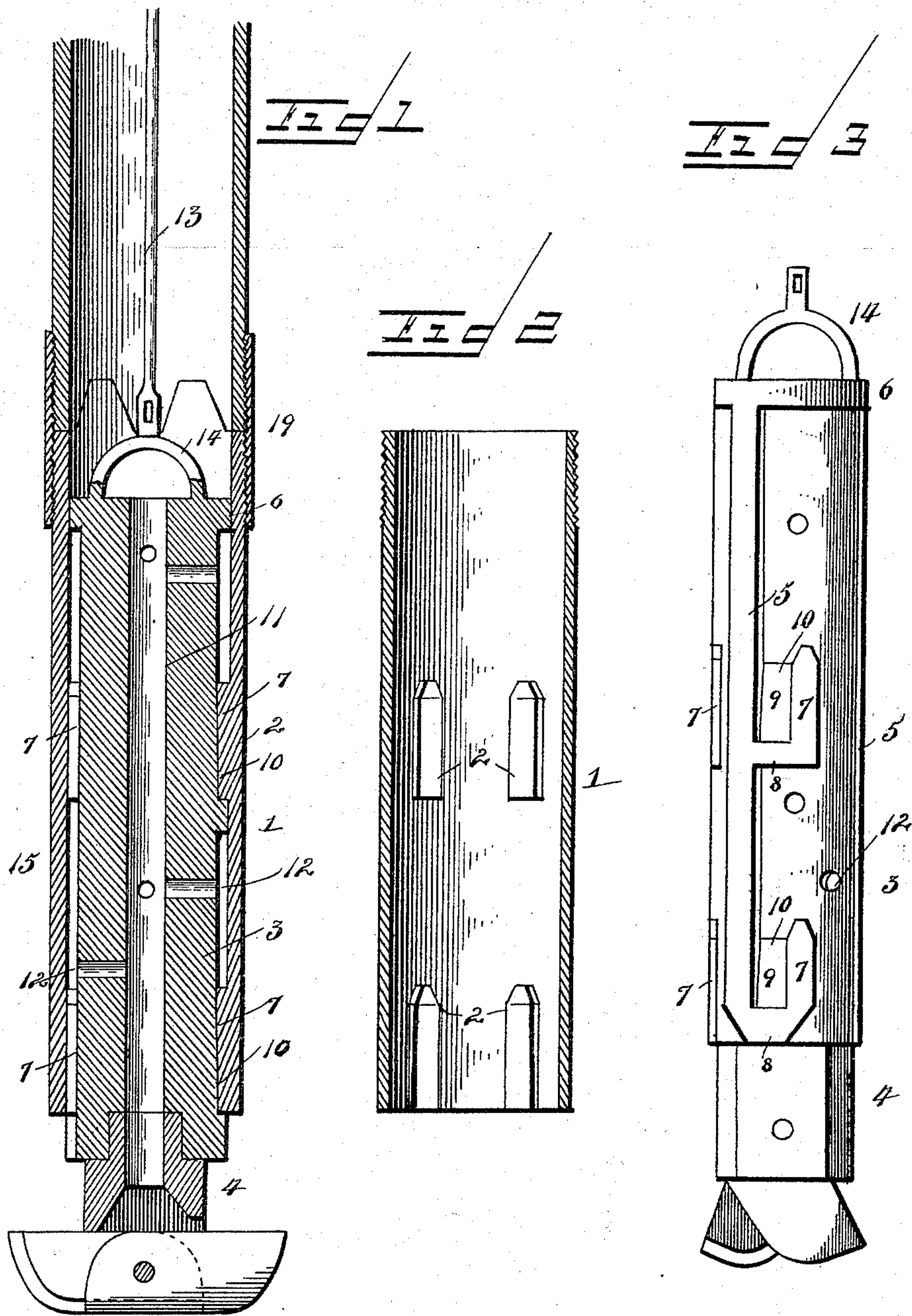


(No Model.)

S. A. HORTON.  
WELL DRILLING APPARATUS.

No. 526,708.

Patented Oct. 2, 1894.



Inventor  
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Witnesses

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By his Attorneys,

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# UNITED STATES PATENT OFFICE.

STEPHEN A. HORTON, OF CLARKSVILLE, TEXAS.

## WELL-DRILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 526,708, dated October 2, 1894.

Application filed September 1, 1893. Serial No. 484,535. (No model.)

*To all whom it may concern:*

Be it known that I, STEPHEN A. HORTON, a citizen of the United States, residing at Clarksville, in the county of Red River and State of Texas, have invented a new and useful Well-Drilling Apparatus, of which the following is a specification.

My invention relates to Artesian or oil well drilling apparatus, and especially to means for detachably securing the drill-bit to the tubing, and it contemplates the provision of improved means whereby an expansion drill bit or blade of any preferred construction can be secured to or detached from the drill tubing without removing the latter from the well.

The object of my invention is to provide improved means for attaching the core, which represents one part of the coupling and carries the drill-bit to the shell, which represents the other part of the coupling, by a rotary forward motion of the tubing, or a motion in the direction of drilling, and for detaching the same by an opposite movement of the tubing. In order to permit of this reverse rotation of the tubing I have found it necessary to provide means for coupling the sections of the tubing whereby accidental detachment is avoided, and hence in setting forth my invention I have shown and described a coupling for the sections of tubing whereby the tubing may be rotated in either direction without affecting the security of the connections.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings; Figure 1 is a vertical axial section of a portion of a well tubing provided with drill-bit securing devices embodying my invention. Fig. 2 is a sectional view taken centrally of the shell detached from the tubing and the core removed. Fig. 3 is a side view of the detachable member or core.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

The fixed member or shell 1 is provided with interior spaced ribs 2, which are disposed parallel with the axis of the shell and are divided to form separate parts arranged

in alignment with intervening open spaces; and the core 3, which carries the expansion bit 4, is provided with exterior vertical ribs 5, extending from the upper to the lower end of the core and connected at their upper ends by a stop-shoulder 6. Intermediate between the ribs 5 are arranged vertical auxiliary ribs 7, which are connected at their lower ends to the main ribs, respectively, by horizontal bearing-ledges 7, thus forming pockets 9 between the auxiliary and main webs, of which the ledges form the floors. The distance between the upper edges of the ledges corresponds with the distance between the lower ends of the parts of the ribs in the shell. The diameter of the core is increased within the pockets to form cam or wedge faces 10, for a purpose hereinafter described, and the upper ends of the auxiliary ribs, the lower ends of the main ribs 7, and the upper ends of the ribs 2 are tapered to facilitate the application of the members.

The core is hollow, being provided with a bore 11, with which communicate perforations 12 formed in the wall of the core, the bore 11 being designed to allow water to pass from above the core to the drill-bit, and the perforations 12 facilitating the lowering of the core into the casing by allowing the escape of air and water from the space around the core to the interior thereof. An operating rod or cable 13 is connected to the upper end of the core by means of a yoke or staple 14.

In operation the shell or fixed member of the coupling is attached to the lower end of the lowermost section 15 of the well tubing, and when it is desired to attach a bit to the tubing, the latter is secured to the lower end of the core and the core is lowered by means of the attached rod into the tubing until the stop-shoulder on the core comes in contact with the upper ends of the ribs in the shell. The parts are guided to this position by the tapered upper ends of the ribs 2 and lower ends of the ribs 5. With the parts in the relative positions mentioned, the core may be rotated to the left, or in a direction reverse to that of the rotation of the tubing during the drilling operation, by twisting the rod before the lower end of the drill-bit comes in contact with the lower end of the hole, but it is also possible (and desirable when a cable



is employed) to adjust the parts to bring the ribs in alignment with the pockets on the core by rotating the tubing in the direction of drilling, and at the same time gradually lowering the tubing. When the blades of the bit come in contact with the bottom of the hole the rotation of the core, which heretofore has been equal to that of the tubing, will be checked, and the tubing will continue to rotate independently of the core until the ribs 2 come in contact with the edges of the main ribs 5. After this the core will rotate with the tubing, but as the tubing is gradually lowered the interior ribs of the shell will pass into the pockets 9 on the core, thus locking the two members firmly together. The lock is made still more secure by the cam surfaces within the pockets against which the inner surfaces of the ribs bite and prevent vibration of the core, said ribs being correspondingly tapered.

To remove the drill-bit the tubing is elevated a sufficient distance to enable the core to drop and release the ribs of the shell from the sockets of the core; and in case the parts cling together and the core is elevated by the frictional contact thereof, it may be released by striking the upper end of the rod 13, or tapping the tubing with a sledge and jarring the same, after which the core may be rotated to the right, or the tubing may be rotated to the left, at the same time that it is lowered gradually to bring the lower ends of the blades into contact with a fixed object in order to prevent the core from turning with the shell.

From the above description it will be apparent that my invention is designed to provide for attaching and detaching a drill-bit by means controlled by the rotation of the tubing, thereby necessitating either a forward or a backward rotation of the tubing in applying or removing the bit. In order to accomplish this operation successfully and without causing the disconnection of the sections of the well tubing, it is necessary to provide a coupling between such sections which will permit rotation in either direction. In Fig. 1 I have shown such a connection in which the ends of the sections are oppositely screw-threaded exteriorly and are provided with terminals having intermeshing irregularities or serrations, and these extremities of the sections are engaged by a sleeve 19, which is

screw-threaded interiorly in opposite directions from its center to its terminals. In connecting the adjoining sections their extremities are fitted in opposite ends of the sleeve, and the latter is rotated, thereby drawing the two ends toward each other until their terminal irregularities or serrations intermesh and prevent independent rotation of either section.

It will be understood that when a cable is employed, an auger-bit and jars must be interposed between the core and the cable to give sufficient weight for a proper operation in coupling and uncoupling. It will be understood, furthermore, that various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

1. In a rotary well-drilling apparatus, a coupling for connecting a drill bit to the drill tube, comprising detachable telescoping members, the exterior member or shell being provided with interior spaced ribs, and the interior member or core being provided with exterior longitudinal ribs 5, short parallel ribs 7, ledges 8 connecting the lower ends of the short ribs 7 to the continuous ribs 5, and a stop-shoulder 6 connecting the upper ends of the ribs 5, substantially as specified.

2. In a rotary well-drilling apparatus, a coupling for connecting the drill bit to the drill tube, comprising detachable telescoping members, the exterior member or shell being provided with interior spaced tapered ribs 2, and the interior member or core being provided with pockets 9 having closed lower ends and beveled surfaces 10, whereby as the ribs 2 are fitted into said pockets by the descent of the exterior member or shell the beveled surfaces of the said ribs engage the beveled surfaces of the pockets and bind the parts against independent vibration, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

STEPHEN A. HORTON.

Witnesses:

H. C. MOORE,  
J. J. EARLY.