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G. W. HOFFMAN

PIPE COUPLING ATTACHMENT FOR ROTARY DRILLING MACHINES

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FIG. 1.

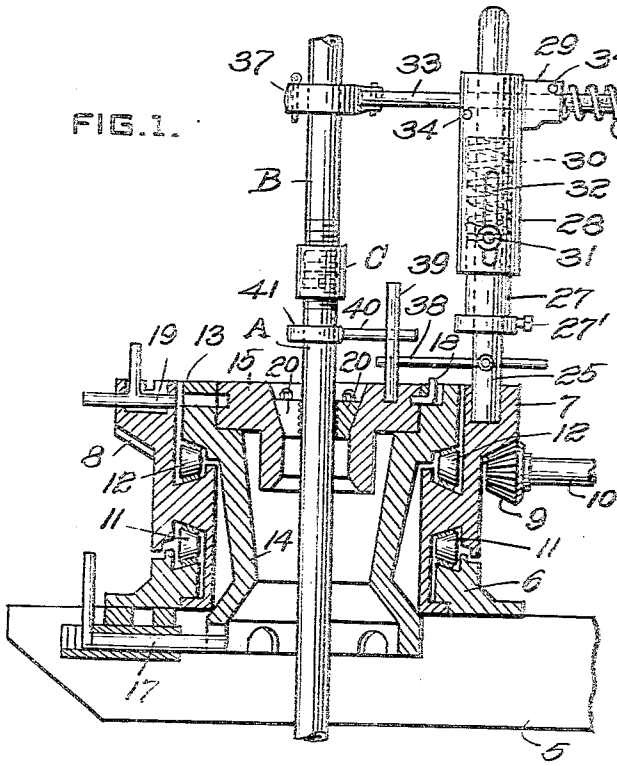


FIG. 3.

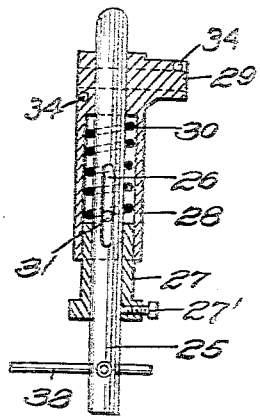
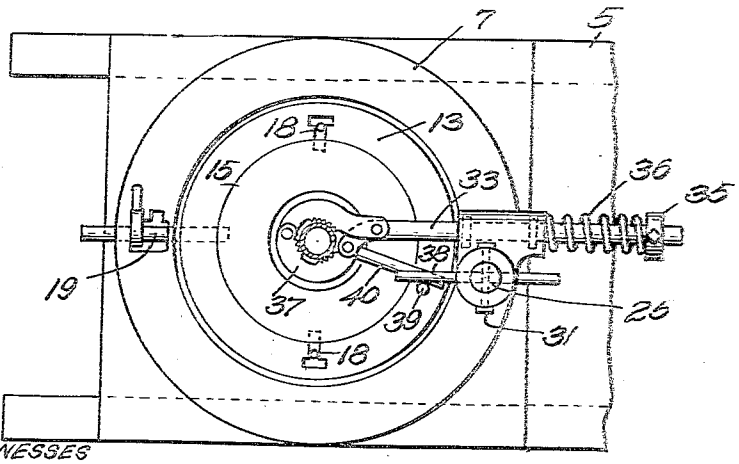


FIG. 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

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PIPE-COUPLING ATTACHMENT FOR ROTARY DRILLING MACHINES.

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To all whom it may concern:

Be it known that I, GEORGE W. HOFFMAN, a citizen of the United States, residing at Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in Pipe-Coupling Attachments for Rotary Drilling Machines, of which the following is a specification.

My invention relates to an attachment to be used on rotary drilling machines which are so designed that the sections of pipe forming the drill shaft may be screwed together by the operation of the machine, and particularly to a tong holding and manipulating device for such machines.

Rotary well boring machines have recently come into use in which the rotary table is composed of outer and inner parts, so arranged that the outer member may be revolved independently of the inner one, or which, when revolving, may, at the will of the operator, transmit motion to the inner member. In such machines, means are also provided for positively locking the inner member against rotation when it is desired that only the outer member rotate.

It is contemplated in such machines, that both members be driven or rotated for rotating the drill shaft to bore, but that when it is necessary to add another section of drill shaft, the inner member be locked against rotation while the outer one be rotated, and that tongs be supported in the outer member to engage the section of pipe to be added to transmit the rotative movement of the outer table member thereto to thread the pipe section into the drill shaft held stationary by the inner member. No provision has been made in such machines for supporting the pipe tongs for rotating them and for letting them move downwardly as the pipe sections thread together.

It is an object of the present invention to provide a support for the tongs to hold them in position to readily engage the pipe sections.

It is a further object to provide means whereby the tongs may move vertically to compensate for the telescoping movement of the pipe sections as they thread together.

A further object is to provide an improved means for causing the tong to effectively grip the pipe after the tong has been properly set.

These and other objects will be apparent from the accompanying drawings, together with the description thereof.

In the drawings:

Fig. 1 represents a vertical sectional view through a rotary table, showing my invention applied thereto;

Fig. 2 is a top view of the apparatus; and

Fig. 3 represents a vertical section through the tong holder.

Referring to the drawing, 5 indicates a supporting frame in the form of skids on which the rotary drilling mechanism is carried. This mechanism comprises a stationary pedestal 6 on which is supported a rotary table 7. On the table 7 is an annular rack 8 in which engages a driving pinion 9 that is driven from any suitable source of power (not shown) through shaft 10. Antifriction bearings on which the table is carried are indicated at 11. Mounted on antifriction rollers 12 on the rotary table 7, is an inner member or drive ring 13 having a depending portion 14 and in which is a bushing 15.

At 17 is a reciprocable pin adapted to be moved into and out of engagement with notches in the depending portion 14, by means of which the drive ring may be positively locked against rotation. 18 designates slidable pins adapted to hold the bushing 15 in position and to transmit motion from the drive ring thereto. A slidable pin 19 on the rotary table 7 adapted to enter openings in the drive ring 13 is provided to transmit motion from the table 7 to the ring 13. In a central opening in bushing 15 are slips 20 by means of which the pipe section A is held suspended in the bore during the time when another section of pipe is to be added.

In the rotary table 7 is a recess or socket in which is inserted a vertical post 25, which is slotted at 26. Slidable on the post 25 is a bushing 27 adjustably secured in place by means of a set screw 27'. Telescoping over a portion of this bushing is the tool holding member or carrier 28 which is also slidable on the post 25. At the upper end of this tool holding member 28 and on one side thereof is a transversely extending arm 29 having a bore therethrough at right angles to the post, forming a guide for a tong handle. A compression spring 30 is placed within the tool holding member 28,

and rests against the bushing 27 to yieldably support the tool holding member. A transverse bolt 31 passing through oppositely positioned slots 32 in the member and slot 26 in the post, serves to retain such member in position and prevent it from rotating on the post.

Extending through the horizontal bore in the arm 29 on the tool holding member 28 is the handle 33 of a pipe tong of any suitable kind, and in order that it may be freely slidable, rollers may be provided in the bore at 34. A collar 35 is adjustably secured on the projecting end of the tong and a compression spring 36 embracing the tong handle and acting against this collar urges the tong to a retracted position away from the pipe. In some instances, it might be advantageous to place this spring in other positions to urge the tong in the direction of the pipe.

At the end of the handle 33 is the pipe gripping tong 37 which may be of any preferred construction, and which grips the pipe section B which is to be screwed into place. C is the threaded coupling.

Inasmuch as it frequently happens that the tongs will not grip the pipe until pressure has been applied to the handle, I provide a transverse rod or pin 38 which I term a "kick-pin" and which is adjustably secured in the post 25. The end of the kick pin extends inwardly sufficiently far to engage a vertical pin 39 on the bushing 15. The handle 40 of a second pipe tong 41 also engages this pin to ensure against the pipe A rotating.

In the use of the invention, the pipe section A, which during the drilling operation is connected to a grief or grip stem (not shown), is elevated and the slips 20 put in place, after which the grief stem is detached and the next section of pipe B is brought into position in vertical alinement with the shaft A, with its threaded end inserted in the threaded coupling C. Tongs 41 and 37 are then secured about the pipe sections A and B respectively, and with the parts in the position shown in Fig. 1, the table is rotated while the drive ring, carrying pin 39, remains stationary.

It may happen when certain kinds of tongs 37 are used, that when the table rotates, rotating the tong and tong holder 28 with it, the tong will not immediately grip the pipe, it requiring pressure on the handle to cause the tong to grip. Therefore, as soon as kick-pin 38 engages vertical pin 39 on the stationary drive ring, the post 25 will be partially rotated, thereby applying pressure to tong lever 33, and so bringing the jaws of tong 37 into gripping contact with the pipe. When the kick-pin has thus turned post 25, it will be in a tangential position and can ride past pin 39. As the table rotates, the pipe section B will thread into coupling C, gradually moving downwardly. A corresponding downward movement will be transmitted to the tong 37 and its handle 33. This will cause member 28 to move downwardly against the pressure of spring 30. Tong 41 serves to aid in preventing section A and coupling C from rotating with section B. The device might also be used for detaching the sections of pipe as the drill shaft is elevated to withdraw the bit.

I do not claim the rotary table as my invention, nor do I limit myself to the application of my invention to the specific form of rotary table described. Neither do I limit my invention to the specific tong holding and manipulating device shown, as it is but an embodiment of my invention and changes may be made within the scope of the appended claims.

What I claim is:

1. A tong holding device for rotary drilling machines comprising a post adapted to be supported on the machine, a bushing adjustable on said post, a tool holding member slidable on said post, and a spring between the bushing and tool holding member for yieldably supporting the latter.

2. A tong holding device for rotary drilling machines comprising a post adapted to be supported on the machine, a bushing on said post, a tong holding member slidable on said post, a spring between the bushing and tool holding member, and means for retaining the tool holding member on the post and preventing it from turning thereon.

3. A tong holding device for rotary drilling machines comprising a vertical member, a tong carrying member vertically slidable thereon, a transverse guide on said member for slidably receiving a tong, and means for yieldably supporting the tong carrying member.

4. The combination with a tong having a handle thereon, of a holding device therefor comprising a vertical member, a tong carrier slidable thereon and having a transverse guide in which the tong handle is slidably supported, and a spring engaging the carrier and means on the tong handle tending to move the tongs horizontally relatively to the pipe to be engaged.

5. In combination with a rotary drilling machine having a table, a drive ring, means whereby the table may be rotated while the drive ring is held against rotation, and a drill shaft formed of threaded sections supported by the drive ring, of means for turning a section of shaft to thread it into a section held on said drive ring comprising a tong adapted to engage a section of shaft to be added, means on the table for supporting the tong, and means whereby the tong and tong supporting means may move ver-

tically to automatically adjust themselves to the movement of the pipe section to be added.

6. In combination with a rotary drilling machine having a table, a drive ring, means whereby the table may be rotated while the drive ring is held against rotation, and a drill shaft formed of threaded sections supported by the drive ring, of means for turning a section of shaft to thread it into or out of a section held in said drive ring comprising a tong for engaging a section of pipe to be added, means on the table for supporting the tong including a slidably mounted member arranged to be automatically raised and lowered with a corresponding movement of the tong, whereby the tong and slidable member may move vertically to adjust themselves to the movement of the pipe section to be turned, and means for engaging the pipe section supported in the drive ring for preventing it from rotating.

7. In combination with a rotary drilling machine having a table, a drive ring, and means whereby the table may be rotated while the drive ring is held against rotation, and a drill shaft formed of threaded sections supported by the drive ring, of means for turning a section of shaft to be added to thread it into a section held in said drive ring comprising a tong adapted to engage the section to be added, means on the table for supporting said tong, and means for applying pressure to the tong to cause it to grip the section to be added upon rotation of the table.

8. In combination with a rotary drilling machine having a table, a drive ring and means whereby the table may be rotated while the drive ring is held against rotation, and a drill shaft formed of threaded sections supported by the drive ring, of means for turning a section of shaft to thread it into a section held in said drive ring comprising a post supported on the rotary table, a tong holding member slidable on said post, a tong carried by said tong holding member and adapted to engage the section of shaft to be added, and means carried by the post adapted to engage stationary means on the drive ring to move said tong into gripping relation with the section of pipe to be added upon rotation of the table.

9. The combination with a make and break rotary having relatively stationary and movable members when said rotary is being used in making up pipe joints, of a tong post mounted on the relatively movable member, a tong supporting means on the post movable vertically relatively thereto, and a tong carried by the supporting means whereby the tong may move vertically with the pipe which it engages.

10. The combination with a make and break rotary having relatively stationary and movable members when said rotary is being used in making up a pipe joint, a string of pipe non-rotatably held in the stationary member, said string having a coupling at its upper end, a section of pipe to be added having its lower end threaded and entered in the coupling, a tong post on the relatively movable section, a tong carrying means on the post movable vertically with respect thereto, a tong on said means engaging the section of pipe to be added, said vertically movable carrying means permitting the tong to move down as the upper section is screwed into the coupling, and means for urging the tong supporting means upwardly.

In testimony whereof I affix my signature.

GEORGE W. HOFFMAN.

Witnesses:
ROY D. WEBB,