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1,559,932

C. J. BOGEN

ROTARY SLIP FOR DRILLING OIL WELLS

Filed May 14, 1924

Fig. 1.

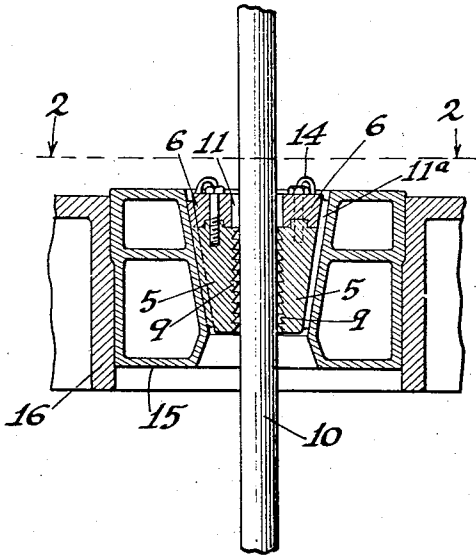


Fig. 2.

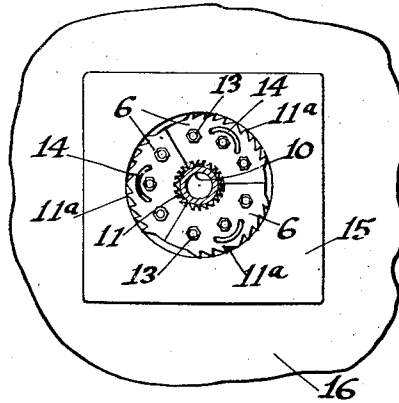


Fig. 3.

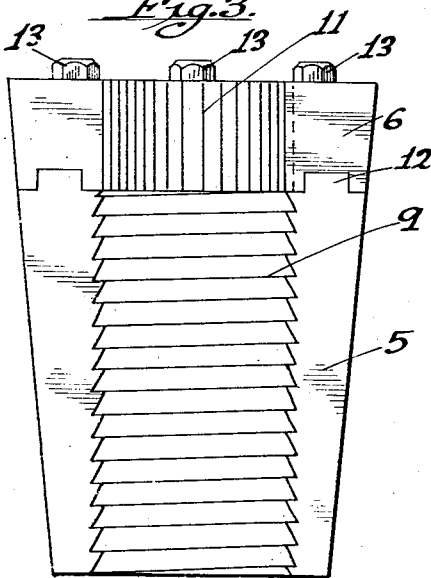
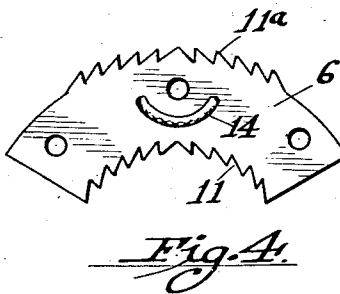


Fig. 4.

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UNITED STATES PATENT OFFICE.

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ROTARY SLIP FOR DRILLING OIL WELLS.

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To all whom it may concern:

Be it known that I, CHARLES J. BOGEN, a citizen of the United States, residing at Huntington Beach, in the county of Orange and State of California, have invented new and useful Improvements in Rotary Slips for Drilling Oil Wells, of which the following is a specification.

This invention relates to slips for wells, said slips being used to grip the drill pipe when pulling out from or running into the well a string of drill pipes.

An object of this invention is the provision of a slip having formed thereon both substantially vertical and substantially horizontal teeth, the latter being employed to hold a string of pipe at any desired vertical position, and the former being used to grip the pipe to prevent rotation thereof when screwing another pipe length on to it or unscrewing another pipe length from it.

Another object of this invention is the provision of substantially vertical teeth on the back or convex side of a slip, said teeth being adapted to prevent the rotation of the slip in the bushing in which it is placed.

With the foregoing objects in view, together with such other objects and advantages as may subsequently appear, this invention consists in the construction and arrangement of parts hereinafter described and claimed and illustrated in the accompanying drawings, in which:

Figure 1 is an elevational view of a fragment of a drill pipe, shown as being held in suspension by my improved slips, the slips being shown in relation to a table bushing, which is inserted in a square hole in a rotary table, which is used for rotating the drill pipe when drilling,

Fig. 2 is a plan view taken on the line 2—2 of Fig. 1,

Fig. 3 is an elevational view of my improved slip, the view taken from the concave side, and

Fig. 4 is a plan view of Fig. 3.

Referring to the drawings for a more detailed description thereof, the slip of my invention, best shown in Fig. 3, comprises a lower section 5 and an upper section 6, each section being arcuate in cross section, having a tapered curved outer surface, and tapered in vertical section, and secured together. The section 5 has a curved inner surface on which are formed gripping teeth 9 adapted to fit the curve of a drill pipe 10, shown in

Fig. 1. The teeth 9 are substantially horizontal. The section 6 has a curved inner surface on which are formed teeth 11 adapted to grip the drill pipe 10. The teeth 11 are substantially vertical. Teeth 11*, which are substantially vertical, are formed on the outer curved surface of the section 6.

The section 5 has an arcuate tongue 12 formed in the middle of its upper end and this tongue fits into a corresponding recess in the section 6. Threaded bolts 13 extend through the section 6 into the section 5, as clearly shown in Fig. 1, and serve to secure the two sections of the slip together.

The upper end of the section 6 is provided with a handle 14. The use of my slips as illustrated in Figs. 1 and 2, there being three slips employed to grip the drill pipe 10, these slips being arranged around the pipe. The slips are set into a table bushing 15 which is held in any suitable manner in a square vertical aperture extending through a rotary table 16.

It will be readily seen that the horizontal teeth 9 formed on the slips of my invention will serve to hold the drill pipe 10, and therefore the other pipes in a string, at any desired depth in the well. This is necessary when taking the pipe lengths apart, when pulling a string of drill pipes out of a well and when putting the sections of the drill pipes together when running the string into a well. It will also be appreciated that the vertical teeth 11 formed on the section 6 will prevent the rotation of the pipe gripped by the slips and that the teeth 11* formed on the outer surface of the section 6 will prevent the rotation of the slips in the bushing 15.

A very advantageous feature of the improved slip resides in the particular construction and arrangement of the teeth thereon. As clearly shown upon the drawing, the upper surfaces of the horizontal teeth 9 are substantially horizontal, so that they present horizontal shoulders on the upper sides of each tooth. The vertical teeth 11 are divided into two series, which have the appearance of being pointed in opposite directions. In a similar manner the vertical teeth 11* on the outside of the slip present the appearance of being pointed toward the opposite ends of the body of the slip. The reason why these series of teeth appear to be so pointed resides in the fact that the right hand sides of the right hand series of the vertical teeth 11, as shown in Fig 4, extend

radially from the center of curvature of the body of the slip. The left hand sides of the left hand series of the vertical teeth 11 also extend radially from the center of curvature of the slip. Consequently, the radial surfaces of the two series of teeth forming the vertical teeth 11 on the slip may be considered as being exposed toward the right and left hand ends of the body of the slip. In a similar manner the two series of teeth forming the outside teeth 11^a have one side of each tooth radial from the center of curvature of the slip, so that these radially extending surfaces are exposed toward the ends of the body. The advantage of having the teeth so arranged is that when the edges of the teeth dig into the pipe or the rotary table, the portions of the pipe become marred and form projections which rest on surfaces at right angles to the directions of movement. This is a more advantageous construction than if the teeth both horizontal and vertical were V-shaped in form. In such cases the marred material of the pipe 10 or the table engage upon inclined shoulders and tend to slip off.

In taking two sections of pipes apart, the slips are taken out of the bushing 15 and the string of pipe is lifted until the pipe joint is above the table 16 at any suitable height. The slips are then put into the bushing 15. The pipe section which is to be taken off the pipe string may then be held against rotation while the table 16 is rotated to unthread the sections from each other.

In screwing two sections of the pipe together, the rotary table 16 is rotated in the proper direction while the pipe above the table is held against rotation.

It is to be understood that while I have shown my improved slips as positioned in a bushing, which is generally not used in practice, the slips of my invention may be seated directly in the turntable, as are those of the prior art.

This invention has been described, but modifications thereof may be devised without departing from the spirit thereof, and it is to be understood that such modifications come within the scope of this invention.

What is claimed is:

1. A slip for wells composed of upper and lower sections, horizontal teeth formed upon the inside surface of the lower section, and vertical teeth formed upon the inside and outside surfaces of the upper section.

2. A pipe slip for wells comprising an arcuate body having a series of substantially horizontal teeth and a series of vertical teeth formed upon the interior surface thereof, the horizontal teeth having their upper sides formed to present substantially horizontal shoulders, and each of the vertical

teeth having one side presenting a surface extending radially from the center of curvature of the body.

3. A pipe slip for wells comprising an arcuate body having a series of vertical teeth formed upon the interior and exterior surfaces thereof, each tooth of each series having one side presenting a surface extending radially from the center of curvature of the body.

4. A pipe slip for wells comprising an arcuate body having two series of vertical teeth formed upon the interior surface thereof, each tooth of each series having one side presenting a surface extending radially from the center of curvature of said body, the mentioned sides of the teeth on one series being exposed toward one end of the body and the mentioned sides upon the other series being exposed toward the other sides of said body.

5. A pipe slip for wells comprising an arcuate body having two series of vertical teeth formed upon the exterior surface thereof, each tooth of each series having one side presenting a surface extending radially from the center of curvature of said body, the mentioned sides of the teeth on one series being exposed toward one end of the body and the mentioned sides upon the other series being exposed toward the other sides of said body.

6. A pipe slip for wells comprising an arcuate body having two series of vertical teeth formed upon the interior and exterior surfaces thereof, one of the series of teeth upon the interior and exterior surfaces having sides extending radially from the center of curvature of the body and being exposed toward one end of the body, the other series of teeth upon the interior and exterior surfaces having sides which extend radially from the center of curvature of the body but are exposed toward the other end of the body.

7. A pipe slip for wells comprising an arcuate body having a series of substantially horizontal teeth, the upper sides of which are substantially horizontal, and having two series of vertical teeth formed upon the interior and exterior surfaces thereof, one of the series of teeth upon the interior and exterior surfaces having sides extending radially from the center of curvature of the body and being exposed toward one end of the body, the other series of teeth upon the interior and exterior surfaces having sides which extend radially from the center of curvature of the body but are exposed toward the other end of the body.

In testimony whereof I have signed my name to this specification.

CHARLES J. BOGEN.