Dec. 18, 1962 P. M. SMITH ET AL 3,068,963

LATCH FOR ROTARY TABLES

Filed March 24, 1960

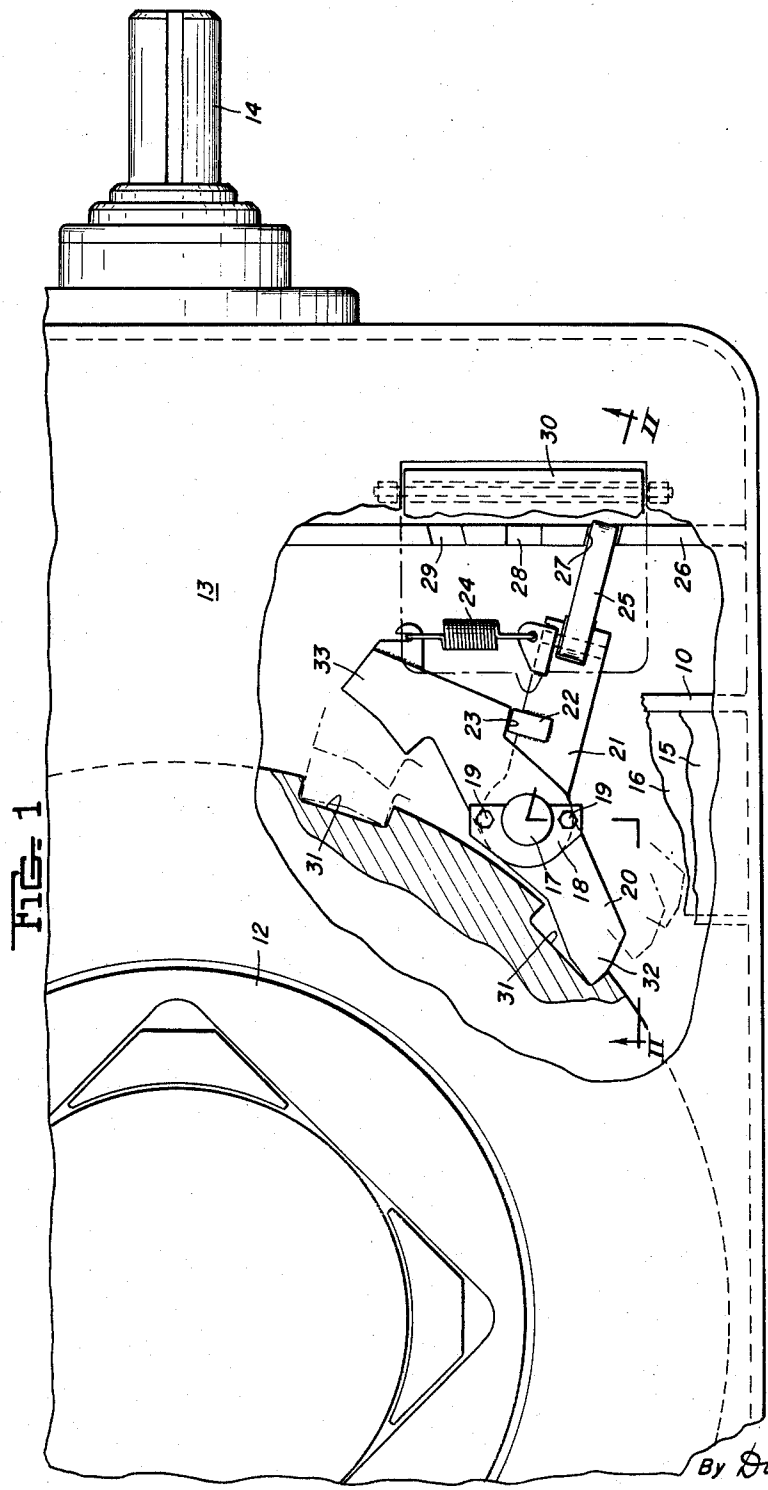


FIG. 1

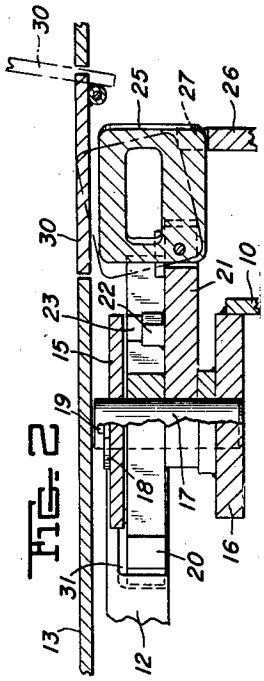


FIG. 2

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United States Patent Office 3,068,963 Patented Dec. 18, 1962

3,068,963

LATCH FOR ROTARY TABLES

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Filed Mar. 24, 1960, Ser. No. 17,428
6 Claims. (Cl. 188—69)

This invention relates to an improved latch for a rotary table used in well-drilling.

During a normal drilling operation a rotary table is free to rotate in either direction, but for some operations (for example, adding or removing lengths of drill pipe) its rotation must be restricted. Consequently a conventional rotary is equipped with a releasable latch which can hold the table against rotation in one or both directions. Commonly the latch coacts with the pinion shaft through which the table is driven, but this arrangement has a disadvantage that the pinion and gear teeth sustain the load and hence may be damaged. Latches which coact with the table directly also are known and of course overcome the foregoing disadvantage. Nevertheless previous latches of this type with which we are familiar not only are unduly awkward to apply and release, but also are subject to unintentional release through impact or vibration.

An object of our invention is to provide an improved latch which coacts directly with a rotary table and is easily applied or released, yet is positive in its action.

A further object is to provide an improved latch which offers the foregoing advantages and can hold a rotary table against rotation in one direction while permitting rotation in the other direction, or can hold the table against any rotation.

A more specific object is to provide an improved latch which includes a dog pivoted on a vertical axis for coacting directly with a rotary table and preventing rotation in one or both directions, an operating lever for the dog, and an easily accessible handle pivoted to the lever for positively fixing the dog in its different positions.

In accomplishing these and other objects of the invention, we have provided improved details of structure, a preferred form of which is shown in the accompanying drawing, in which:

FIGURE 1 is a fragmentary top plan view, with parts broken away, of a rotary equipped with our improved latch; and

FIGURE 2 is a vertical sectional view on line II—II of FIGURE 1.

The drawing shows a well-drilling rotary which includes a stationary base **10**, a rotatable table **12** mounted on suitable bearings (not shown) within the base, a cover **13** fixed to the base, and a pinion shaft **14** extending from one end of the base and connected to the table through a suitable pinion and ring gear (not shown). Apart from our novel latch, the rotary can be of any standard or desired construction; hence its conventional parts are not shown nor described in detail.

In accordance with our invention, upper and lower spaced horizontal plates **15** and **16** are fixed to upstanding walls of base **10** and extend inwardly therefrom beneath cover **13**. A vertical pivot pin **17** is fixed to these plates and extends therebetween adjacent the circumferential edge of table **12**. In the illustration the upper end of the pin carries a flange **18** which is welded thereto and removably fixed to the upper plate **15** with screws **19**. A dog **20** and an operating lever **21** are pivotally mounted on pin **17** in the space between plates **15** and **16**. The dog overlies the lever, and the two can pivot independently on a common vertical axis. The operating lever has an integral upstanding stop **22** adapted to abut a shoulder **23** on dog **20**. A tension spring **24** is connected between the lever and dog for holding the dog in a position in which the shoulder abuts the stop.

A handle **25** is pivoted on a horizontal axis to the end of lever **21** remote from pin **17** and can be raised or lowered manually about its pivot. Base **10** includes a fixed vertical plate **26** which is located beneath the handle and has three notches **27**, **28** and **29** in its upper edge. The lower edge of the handle can be inserted in any one of these notches. When the handle is inserted in the middle notch **28**, dog **20** clears table **12** to permit free rotation in either direction. When the handle is inserted in notch **27**, the dog engages the table in a manner to hold it against counterclockwise rotation but permit clockwise rotation, as hereinafter explained. When the handle is inserted in notch **29**, the dog engages the table in a manner to prevent any rotation, also as hereinafter explained. Cover **13** has a door **30** which can be opened to furnish access to the handle. Preferably the inside face of the door carries suitable legends which indicate the different handle positions.

The circumferential edge of table **12** contains a series of spaced apart notches **31**. Dog **20** has a ratchet end **32** and a locking end **33**. When handle **25** is inserted in notch **27**, the ratchet end **32** of the dog enters one of the notches **31**. A counterclockwise rotational force applied to the table forces shoulder **23** on the dog against stop **22** on the operating lever **21**, whereby no rotation can take place. A clockwise rotational force causes the dog to pivot against the action of spring **24**, whereby rotation can take place in this direction. When handle **25** is inserted in notch **29**, the locking end **33** of the dog enters one of the notches **31**. The stop **22** on the operating lever bears against shoulder **23** on the dog and positively holds the locking end within the notch, whereby no rotation can take place in either direction.

From the foregoing description, it is seen that our invention affords a rotary table latch which is of simple construction yet overcomes disadvantages of previous latches. Our latch engages the table directly and hence cannot cause damage to pinion or gear teeth. The dog in our latch is positively held in engagement with the table through its engagement with the stop on the operating lever and engagement of the handle within one of the notches **27** or **29**. Thus there is no likelihood of the latch releasing itself unintentionally. At the same time the handle is easily accessible at the top of the rotary for changing the position of the latch. It is apparent the latch can be made of opposite hand if it is desired to stop clockwise rotation and permit counterclockwise rotation, or that the rotary can be equipped with a second latch of opposite hand.

While we have shown and described only a single embodiment of the invention, it is apparent that modifications may arise. Therefore, we do not wish to be limited to the disclosure set forth but only by the scope of the appended claims.

We claim:

1. In a well-drilling rotary which includes a stationary base and a table rotatably supported on said base and having notches in its circumferential edge, the combination therewith of a device mounted on said base adjacent the circumferential edge of said table for latching said table, said device comprising a dog having spaced apart ends, a ratchet member on one end of said dog, a locking member on the other end of said dog, means mounting said dog for pivotal movement about a vertical axis located between its ends so that said dog has a first position in which it clears said table to permit free rotation thereof, a second position in which said ratchet member directly engages one of said notches and prevents rotation of said table in one direction but permits rotation in the other direction, and a third position in which said locking

member directly engages one of said notches and prevents any rotation of said table, an operating lever engaging said dog, means mounting said lever on said base for pivotal movement on a vertical axis, a handle carried by said lever for positioning said dog, and means fixed to said base receiving said handle and positively retaining it in the position in which it is placed.

2. In a well-drilling rotary which includes a stationary base and a table rotatably supported on said base and having notches in its circumferential edge, the combination therewith of a device mounted on said base adjacent the circumferential edge of said table for latching said table, said device comprising a dog having spaced apart ends, a ratchet member on one end of said dog, a locking member on the other end of said dog, means mounting said dog on said base for pivotal movement about a vertical axis located between its ends so that said dog has a first position in which it clears said table to permit free rotation thereof, a second position in which said ratchet member directly engages one of said notches and prevents rotation of said table in one direction, and a third position in which said locking member directly engages one of said notches and prevents any rotation of said table, an operating lever for said dog having a stop thereon, means mounting said lever on said base for pivotal movement on a vertical axis so that said stop abuts said dog, a spring, means connecting said spring between said lever and said dog for normally holding said dog against said stop but for yielding when said dog occupies its second position to permit rotation of said table in the other direction, a handle carried by said lever for positioning said dog, and means fixed to said base receiving said handle and positively retaining it in the position in which it is placed.

3. In a well drilling rotary which includes a stationary base and a table rotatably supported on said base, the combination therewith of a latching device for said table, said device comprising pivotal mounting means carried by said base, a dog having spaced apart ends and being pivoted on a vertical axis intermediate its ends on said pivotal mounting means, a ratchet member on one end of said dog, a locking member on the other end of said dog, said table having notches in its circumferential edge, said dog having a first position in relation to said pivotal mounting means in which said ratchet and locking members both clear said table and permit free rotation thereof, a second position in which said ratchet member directly engages one of said notches and prevents rotation of said table in one direction but permits rotation in the other direction, and a third position in which said locking member directly engages one of said notches and prevents any rotation of said table, operating means carried by said pivotal mounting means and connected with said dog for placing it in any of said positions, and means fixed to said base and engaging said operating means for positively retaining said dog in the position in which it is placed.

4. In a well drilling rotary which includes a stationary base and a table rotatably supported on said base, the combination therewith of a latching device for said table, said device comprising pivotal mounting means carried by said base, a dog having spaced apart ends and being pivoted on a vertical axis intermediate its ends on said pivotal mounting means, a ratchet member on one end of said dog, a locking member on the other end of said dog, said table having notches in its circumferential edge, said dog having a first position in relation to said pivotal mounting means in which said ratchet and locking members both clear said table and permit free rotation thereof,

a second position in which said ratchet member directly engages one of said notches and prevents rotation of said table in one direction but permits rotation in the other direction, and a third position in which said locking member directly engages one of said notches and prevents any rotation of said table, an operating lever pivoted on a vertical axis on said pivotal mounting means and connected with said dog, a handle carried by said lever for pivoting the lever and thereby placing said dog in any of said positions, and means fixed to said base receiving said handle and positively retaining said dog in the position in which it is placed.

5. In a well drilling rotary which includes a stationary base and a table rotatably supported on said base, the combination therewith of a latching device for said table, said device comprising pivotal mounting means carried by said base, a dog having spaced apart ends and being pivoted on a vertical axis intermediate its ends on said pivotal mounting means, a ratchet member on one end of said dog, a locking member on the other end of said dog, said table having notches in its circumferential edge, said dog having a first position in relation to said pivotal mounting means in which said ratchet and locking members both clear said table and permit free rotation thereof, a second position in which said ratchet member directly engages one of said notches and prevents rotation of said table in one direction but permits rotation in the other direction, and a third position in which said locking member directly engages one of said notches and prevents any rotation of said table, operating means carried by said pivotal mounting means and connected with said dog for placing it in any of said positions, means fixed to said base and engaging said operating means for positively retaining said dog in the position in which it is placed, and means in the top of said base providing access to said operating means.

6. In a well drilling rotary which includes a stationary base and a table rotatably supported on said base, the combination therewith of a latching device for said table, said device comprising a combined ratchet and locking member, means pivotally mounting said member on said base, said table having notches in its circumferential edge, said member having a first position wherein it clears said table and permits free rotation thereof, a second position wherein it engages one of said notches to provide a ratcheting action and prevents rotation of the table in one direction but permits rotation in the other direction, and a third position wherein it engages one of said notches to provide a locking action and prevents any rotation of said table, operating means connected with said base and said member for placing the member in any of said positions, and means fixed to said base and engaging said operating means for positively retaining said member in the position in which it is placed.

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