Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).
Description

[0001] This invention regards a method of securing pipes and other long objects against slipping in a fixing device, especially for securing drill pipes or other similar pipes against slipping in slips of the type used in drilling and production of petroleum. The invention also regards a device for implementing the method.

[0002] When retrieving pipe strings during drilling or other similar operations related to petroleum production, the pipe is moved through slips designed to keep the pipe string in a vertical position when screwing stands (sections of piping) on/off the pipe string. It is known to use slip manipulators for setting the slips around the pipe string, see for example US 2736941 A or US 2829617 A.

[0003] After the pipe string has been raised/lowered by a length corresponding to a length of piping, e.g. by means of the hoisting winch of the drilling device, pipes that are not provided with an external shoulder portion must according to prior art be fitted with a clamp at a position above the slips. The slips is locked, thus gripping the drill string and keeping this in position while the lifting device is disconnected from the pipe string during connection/disconnection of a length of piping.

[0004] If the pipe string were to slip in said slips, the clamp is displaced down to a stop against the wedges of the slips. The net weight of the pipe string is transferred via the clamp to the wedges of the slips, thereby causing them to grip the pipe string more tightly. Thus use of a pipe clamp of said type prevents the pipe string from being lost down the borehole. Pipe clamps are known for example from US 3 037 258 A.

[0005] A new pipe clamp must be fitted prior to removing each stand from the pipe string. The work involved in fitting the pipe clamps causes considerable delay to the pull-up operation.

[0006] The pipe clamps must be removed before moving the pipe string back into the well.

[0007] The object of the invention is to remedy the disadvantages of prior art.

[0008] The object is achieved in accordance with the invention by the characteristics stated in the description below and in the appended claims.

[0009] By connecting a mechanised wedge manipulator comprising a preferably hydraulically actuated pipe clamp to the wedges of the slips, the need for manual fitting of pipe clamps to the pipe string may be eliminated without increasing the risk of losing the pipe string down the borehole.

[0010] During the raising of the drill string, the wedges of the slips are lifted out of the engaged position by means of the manipulator, allowing the pipe string to be moved through the slips sleeve in the normal manner.

[0011] When a new stand is to be disconnected from the pipe string, the wedges are lowered into the slips sleeve to the locking position. The pipe clamp of the wedge manipulator is moved up to the pipe, gripping it.

[0012] The hoisting winch of the drilling device is relieved, whereupon the slips grips and holds the pipe string in a manner that is known per se. If the pipe string were to slip in the slips, the pipe clamp is displaced downwards along with the pipe string until the pipe clamp stops against the wedges. Thus the weight of the pipe string is transferred by means of the pipe clamp to the wedges of the slips, which are then moved into a firmer grip about the pipe string.

[0013] The pipe string is released from the slips in the normal manner by the hoisting winch of the drilling device lifting the pipe string. The pipe clamp is detached from the pipe string and retracted, whereupon the wedges are raised to their inactive position and the pipe string may move freely through the slips.

[0014] The method and device according to the invention renders superfluous an operation that is relatively difficult and dangerous, and also increases the efficiency of the work involved in tripping in and out of a well.

[0015] The following describes a non-limiting example of a preferred embodiment illustrated in the accompanying drawings, in which:

Figure 1 is a side view of a wedge manipulator and where the slips sleeve is shown in section, the wedges of the slips being in their inactive position, whereby the pipe string may move freely through the sleeve of the slips;

Figure 2 shows the same as figure 1, but here the wedges are in the active position in the slips sleeve;

Figure 3 is a plan view of the slips manipulator of figure 2;

Figure 4 shows the slips manipulator in the same position as that of figure 2, but here the pipe clamp of the slips manipulator has been moved to a stop against the pipe string;

Figure 5 is a plan view of the slips manipulator of figure 4;

Figure 6 shows the same as figure 4 after the pipe clamp has been arranged grippingly around the pipe string, and the pipe string has slipped downwards so as to leave the pipe clamp abutting the wedges;

Figure 7 is a plan view of the slips manipulator of figure 6;

Figure 8 shows the slips manipulator with the pipe clamp open and ready to be retracted from the pipe string, and the manipulator is about to pull the wedges out of the locking position; and

Figure 9 is a plan view of the slips manipulator of figure 8.
A device for preventing a pipe string (5) clampingly arranged in slips (2) from slipping out of the slips (2) in the event of the pipe string (5) slipping in the slips (2), where the slips (2) are connected to an arm frame (20) of a slips manipulator (1), and where a pipe clamp (22) is clamped to the pipe string (5) at a position above the slips (2) and maintained in the clamped state essentially for as long as the pipe string (5) is held by the slips (2), the pipe clamp (22), in the event of the pipe string (5) slipping in the slips (2), being displaced together with the pipe string (5) until the pipe clamp (22) stops against the wedges (16) of the slips (2), characterised in that the pipe clamp (22), is connected to the slips manipulator (1) and is hydraulically clamped to the pipe string (5).

2. A device for preventing a pipe string (5) clampingly arranged in slips (2) from slipping out of the slips (2) in the event of the pipe string (5) slipping in the slips (2), the device comprising a slip manipulator and slips (2) connected to an arm frame (20) of said slips manipulator (1), the device characterised in that it further comprises a pipe clamp (22) connected to the slips manipulator (1) wherein the pipe clamp (22) can be releasably clamped to the pipe string (5) at a position above the slips (2) and is designed so as to be displaced with the pipe string until the pipe clamp (22) stops against the wedges (16) of the slips (2), should the pipe string slip in the slips.

3. A device in accordance with Claim 2, characterised in that the pipe clamp (22) is hydraulically movably connected to an arm frame (20).

4. A device in accordance with one or more of Claims 2 to 3, characterised in that the arm frame (20) is...
3. Vorrichtung gemäß Anspruch 2, dadurch gekennzeichnet, dass die Gestängeklemme (22) hydraulisch bewegbar ist.

4. Vorrichtung gemäß einem oder mehreren der Ansprüche 2 bis 3, dadurch gekennzeichnet, dass der Armrahmen (20) parallel bewegbar ist.

5. Vorrichtung gemäß einem oder mehreren der Ansprüche 2 bis 4, dadurch gekennzeichnet, dass die Schwenkhalterung (18) drehbar ist.

6. Vorrichtung gemäß einem oder mehreren der Ansprüche 2 bis 5, dadurch gekennzeichnet, dass der Grundrahmen (6) mit einer Bohrplattform (4) oder alternativ dazu mit der Muffe (14) der Abfangkeile (2) verbunden ist.

Revendications

1. Procédé pour empêcher un train de tiges (5) disposé par serrage dans des coins de retenue (2) de glisser hors des coins de retenue (2) dans le cas où le train de tiges (5) glisse dans les coins de retenue (2), où les coins de retenue (2) sont reliés à un cadre de bras (20) d’un manipulateur de coins de retenue (1), et où un collage de serrage (22) est serré sur le train de tiges (5) au niveau d’une position au-dessus des coins de retenue (2) et maintenu dans l’état de serrage essentiellement tant que le train de tiges (5) est maintenu par les coins de retenue (2), le collage de serrage (22), dans le cas où le train de tiges (5) glisse dans les coins de retenue (2), est déplacé avec le train de tiges (5) jusqu’à ce que le collage de serrage (22) s’arrête contre les coins (16) des coins de retenue (2), caractérisé en ce que le collage de serrage (22) est relié à un manipulateur de coins de retenue (1) et est serré de manière hydraulique sur le train de tiges (5).

2. Dispositif pour empêcher un train de tiges (5) disposé par serrage dans des coins de retenue (2) de glisser hors des coins de retenue (2) dans le cas où le train de tiges (5) glisse dans les coins de retenue (2), le dispositif comprenant un manipulateur de coins de retenue et des coins de retenue (2) reliés à un cadre de bras (20) dudit manipulateur de coins de retenue (1), le dispositif étant caractérisé en ce qu’il comprend en outre un collage de serrage (22) relié au manipulateur de coins de retenue (1), dans lequel le collage de serrage (22) peut être serré de manière amovible sur le train de tiges (5) au niveau d’une position au-dessus des coins de retenue (2) et est conçu de manière à être déplacé avec le train de tiges jusqu’à ce que le collage de serrage (22) s’ar-
rête contre les coins (16) des coins de retenue (2), si le train de tiges glisse dans les coins de retenue.

3. Dispositif selon la revendication 2, caractérisé en ce que le collier de serrage (22) est relié de manière mobile et hydraulique à un cadre de bras (20).

4. Dispositif selon l’une ou plusieurs des revendications 2 à 3, caractérisé en ce que le cadre de bras (20) est relié à un support pivotant (18) d’une manière déplaçable parallèle.

5. Dispositif selon l’une ou plusieurs des revendications 2 à 4, caractérisé en ce que le support pivotant (18) est relié de manière rotative à un cadre de base (6).

6. Dispositif selon l’une ou plusieurs des revendications 2 à 5, caractérisé en ce que le cadre de base (6) est relié à un plancher de forage (4), alternativement au manchon (14) des coins de retenue (2).
REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 2736941 A [0002]
- US 2829617 A [0002]
- US 3037258 A [0004]