Torque absorber for absorbing a torque and an apparatus comprising such a torque absorber

The present invention relates to a torque absorber for absorbing a rotational torque that occurs during the screwing together of tubular elements, and to an apparatus for screwing together tubular elements comprising at least one such torque absorber.

When drilling a hydrocarbon well it is necessary to screw together and unscrew from one another different elements that are to be run into the well. It may be a question of tubular elements that are screwed together or unscrewed from one another, for example, a tubular element that is to be screwed onto or unscrewed from the pipe string during drilling, or other elements to be run into the well that are screwed onto the pipe string. This screwing together takes place with the aid of machines that grip the two elements to be screwed together and screw them together or unscrew them from one another. A problem that arises when screwing elements together is that when, for example, a tubular element is to be screwed onto the pipe string, the threaded connection could be damaged when the tubular element is screwed fully onto the pipe string, i.e., that the "bottom" of the threaded portion is reached, whilst it takes some time before the torque from the drive unit that rotates the tubular element is reduced. In the course of the time it takes to reduce the rotational torque from the drive unit there is a risk that the threaded connection will be damaged or, at worst, destroyed.

Embodiments of the present invention seek to provide a solution able to absorb a rotational torque that occurs when an element is screwed onto another element.

Embodiments of the present invention also seek to provide a solution that prevents damage to a threaded connection when two elements are screwed together automatically.

Embodiments of the present invention also seek to prevent damage to threads when an element is screwed onto a tubular element or a pipe string, such as a tubular element that is screwed onto a pipe string.

According to an aspect of the present invention, there is provided an apparatus for screwing together of corresponding threaded portions on a first tubular element and a second tubular element. The apparatus comprises a first part that is rotatably arranged about an axis V and a second part that is rotatably arranged about the axis V, where the first part and the second part are rotatable relative to one another. The apparatus further comprises at least one torque absorber for absorbing of a rotational torque that occurs between the first part and the second part when the first tubular element and the second tubular element are screwed together. The torque absorber comprises at least one cylinder and at least one piston that is movably arranged in the cylinder, the at least one cylinder being curved in the longitudinal direction of the cylinder and the at least one piston having a corresponding curved

shape such that the at least one piston can be moved into and out of the at least one cylinder, the at least one cylinder being fastened to the first part and the at least one the piston being fastened to the second part.

According to one embodiment of the present invention, the torque absorber comprises at least one cylinder that is circular in shape in its longitudinal direction, and where the length of the cylinder preferably extends over a curve of 180 degrees or less. In the at least one cylinder is arranged a piston that is slightly longer than the cylinder such that when the piston is pushed all the way into the cylinder, it will project from the opposite end of the cylinder. Thus, the

8. An apparatus according to claim 6 and/or 7, characterised in that the first gripping device and/or the second gripping device is rotatably arranged in the apparatus.

9. A torque absorber according to one of claims 1-8, characterised in that the piston comprises an inner end portion that is arranged in the cylinder, which end portion is configured with a main duct extending into the piston in the longitudinal direction from an end face on the piston, and at least one radial duct extending between the main duct and a side face of the piston such that a fluid can flow through the main duct and the at least one radial duct.

10. A torque absorber according to one of claims 1-9, characterised in that the piston has a constant cross-section in the longitudinal direction, and that between the piston and the cylinder in the longitudinal direction there is provided a gap for a fluid.

11. A torque absorber according to one of claims 1-10, characterised in that the cylinder has a first end portion that is provided with a first end cap, in which first end cap there is provided a through end cap duct such that a fluid can flow into and out of the cylinder.

12. A torque absorber according to claim 11, characterised in that the end cap is adapted for fluid connection to a fluid tank such that a fluid can flow back and forth between the fluid tank and the cylinder.

13. An apparatus according to one of claims 1-12, characterised in that the apparatus is provided with at least two torque absorbers, where the positions of the torque absorbers are offset in the circumferential direction relative to one another such that a better distributed load in achieved when absorbing an applied torque.

14. An apparatus according to one of claims 1-13, characterised in that the apparatus is provided with two torque absorbers, where the position of one of the torque absorbers is offset 180 degrees in the circumferential direction relative to the other torque absorber.