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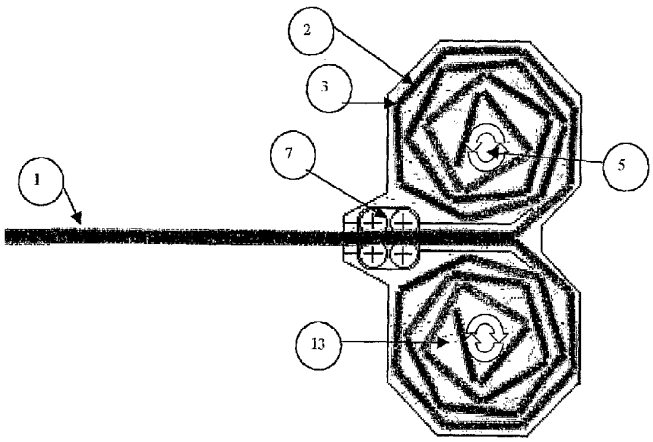
(54) Title: HINGED AND SEGMENTED PIPE



(57) **Abstract:** A rigid pipe (1) is achieved according to the invention in that half-cylinder shaped elements (2) are joined/hinged (3) to each other and where to a such chains are connected together with their concave sides in a zipper-like motion. The two half-cylindrical chains are spooled (13) up individually on each side of a housing (12). This result in a particularly rigid pipe of varying length with a wide area of use.

WO 2004/099524 A1

2004236565 03 Jul 2007

HINGED AND SEGMENTED PIPE

Technical Field

The present invention relates to a rigid pipe that can be used in machines, tools, constructions or as an independent unit.

Background Art

The prior art comprises solutions such as cylinders, telescopic cylinders, rack-and-pinion devices, threaded poles, manipulators, scissor-actuated lifts, coiled pipes, or combinations thereof.

From US patent number 6 283 203 is known a device for drilling oil wells. This device comprises two rack-and-pinion elements having an H-profile in a guide that among other things raises and lowers a pipe in a drilling tower.

From SE 459 267 is known an elongated cylindrical sleeve comprised of two flexible, semi-cylindrical bands that are wound on spools, and sequentially joined together to form the sleeve. This sleeve however does not form a rigid cylindrical pipe of sufficient structural integrity to be used in industrial settings.

Summary of the Invention

In a first broad form, the present invention provides a rigid pipe that can be formed of desired length. The pipe includes two chains of semi-cylindrical pipe sections joined by hinges, that are sequentially locked together to form the rigid pipe. Because the two separate chains of pipe sections are flexible prior to being assembled, the chains may be stored on spools in a housing prior to assembly, thus seeking to provide economy of space, among other advantages that may be apparent to one skilled in the art.

In a further broad form, the present invention provides a rigid pipe of variable length, including a first elongated, flexible pipe-half joined to an opposing second elongated, flexible pipe-half, said elongated pipe-halves being individually wound on spools in a housing and are progressively connected to each other to form a pipe of desired length, wherein each elongated, flexible pipe-half is formed as a chain of rigid, semi-cylindrical pipe sections joined together in series at their opposing ends by hinges, and wherein each rigid pipe section from the first elongated pipe-half comprises a locking means that is complimentary to a locking means on the opposing rigid pipe section from the second elongated pipe-half, such that the complimentary locking means lock the flexible pipe-halves together with their concave side directed towards each other forming an elongated rigid pipe of desired length.

2004236565 03 Jul 2007

In yet a further broad form, the present invention provides a method for forming a rigid pipe of variable length from two elongated, flexible pipe-halves, the method including the steps of:

(i) forming each of the two elongated, flexible pipe-halves by connecting a plurality of rigid, semi-cylindrical pipe sections together in a chain by hinged connections between opposing ends of the rigid sections;

(ii) arranging each chain of rigid pipe sections on a separate spool in a housing of a connection device, the connection device further including a guide member and a drive unit;

(iii) bringing the elongated pipe-halves together in a progressive manner such that the concave sides of each pipe section is successively arranged facing the concave side of an opposing pipe section;

(iv) equipping each rigid pipe section with a locking means that is complimentary to a locking means on its opposing pipe section;

(v) Pressing the opposing pipe sections together such that they lock together; and

(vi) Continuously feeding pipe sections from the connection device until a rigid pipe of desired length is obtained.

At least one of the following advantages of the present invention over the prior art may be provided including:

Longer stroke-length, more compact. Smaller dimensions when assembled;

Simpler design, less expensive, faster to produce, less expensive spare parts;

Adapted for the mounting of various tools at the end of the pipe;

Simple drive unit that does not require large amounts of hydraulic fluid; and

Large capacity (power) and speed.

Brief Description of the Drawings

The present invention will become more fully understood from the following detailed description of a preferred but non-limiting embodiment thereof, described in connection with the accompanying drawings, wherein:

Figure 1 shows both a perspective view of the rigid pipe and housing, and a detailed view of one embodiment the rigid pipe having threads on its outside surface.

Figure 2 shows two detailed views of the hinge and locking means

Figure 3 shows cross sectional view of the pipe sections wound in a housing

Figure 4 detailed view of pipe sections being joined together in a guide, and a cross section of two joined pipe sections

Detailed description of the Embodiment(s)

A rigid pipe of varying length (1) is achieved according to the invention in that half-cylinder shaped elements (2) are hinged (3) to each other and in that the concave sides of two of such chains are connected together in a zipper-like motion. The term "zipper-like motion" is implicitly understood to mean that opposing half-cylinder shaped elements are sequentially joined together to form a rigid pipe of desired length.

The two half-cylindrical chains are rolled up on the each side of the pipe.

In a zipper-like motion, the opposing half-cylindrical elements (2) are locked (4) to each other with the object of preventing the pipe from coming apart / becoming deformed under a load. The term "zipper-like motion" further implies that the locking means (4) from one cylindrical element (2) is complimentary to the locking means (4) from the opposing cylindrical element (2) to which it is attached.

The pipe elements are rolled (13) together in a housing (12) comprising a spool arrangement (5) and a guide (6) that leads the two halves together. In addition, the housing comprises a drive unit (7) that maneuvers the assembled pipe (1) out and in.

The drive unit (7) can function using a threaded pipe-, rack-and-pinion-, active spooling-, or friction principle. With the last-mentioned type, the elements can have a smooth surface. The drive unit will thus function in a similar manner as for a coiled

2004236565 03 Jul 2007

pipe. In the case of a threaded pipe (8) and rack-and-pinion systems, the

2004236565 03 Jul 2007

elements must have threads or teeth respectively. One can envision an active spool arrangement (5) that drives the pipe (1) out.

The purpose of the guide (6) is to lead the two halves together or apart from each other and to prevent rotation of the pipe.

The half-cylindrical elements (2) can be reinforced with internal cross walls (10) and longitudinal ribs (11) to increase in the mechanical strength of the connected pipe (1).

The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as, an acknowledgement or admission or any form of suggestion that that prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

PATENT CLAIMS

1. A rigid pipe of variable length, including a first elongated, flexible pipe-half joined to an opposing second elongated, flexible pipe-half, said elongated pipe-halves being individually wound on spools in a housing and are progressively connected to each other to form a pipe of desired length, wherein each elongated, flexible pipe-half is formed as a chain of rigid, semi-cylindrical pipe sections joined together in series at their opposing ends by hinges, and wherein each rigid pipe section from the first elongated pipe-half comprises a locking means that is complimentary to a locking means on the opposing rigid pipe section from the second elongated pipe-half, such that the complimentary locking means lock the flexible pipe-halves together with their concave side directed towards each other forming an elongated rigid pipe of desired length.

2. A rigid pipe according to claim 1, wherein each rigid pipe section includes internal cross-walls and/or longitudinal ribs for increasing the rigidity of the pipe.

3. A rigid pipe according to claim 2, wherein the rigid pipe sections are brought into opposing alignment with each other by the help of a guide member, and that each rigid pipe section has a groove on its convex outer surface that engages a portion of guide member to prevent rotation of the pipe sections.

4. A rigid pipe according to claim 3, wherein the rigid pipe sections are brought progressively together by the help of a drive unit that actively drives the rigid pipe sections out of housing.

5. A rigid pipe according to claim 4, wherein the convex outer surface of the rigid pipe sections includes threads that engage corresponding threads of drive unit.

6. A rigid pipe according to claim 4, wherein the convex outer surface of the rigid pipe sections includes teeth that engage corresponding teeth of drive unit.

7. A rigid pipe according to claim 4, wherein the convex outer surface of the rigid pipe sections is smooth, and engages corresponding smooth rollers of drive unit by friction.

8. A method for forming a rigid pipe of variable length from two elongated, flexible pipe-halves, the method including the steps of:

(i) forming each of the two elongated, flexible pipe-halves by connecting a plurality of rigid, semi-cylindrical pipe sections together in a chain by hinged connections between opposing ends of the rigid sections;

(ii) arranging each chain of rigid pipe sections on a separate spool in a housing of a connection device, the connection device further including a guide member and a drive unit;

(iii) bringing the elongated pipe-halves together in a progressive manner such that the concave sides of each pipe section is successively arranged facing the concave side of an opposing pipe section;

(iv) equipping each rigid pipe section with a locking means that is complimentary to a locking means on its opposing pipe section;

(v) Pressing the opposing pipe sections together such that they lock

2004236565 03 Jul 2007

together; and

(vi) Continuously feeding pipe sections from the connection device until a rigid pipe of desired length is obtained.

9. The method according to claim 8, wherein the outer convex surface of the rigid pipe sections is smooth, and engages a plurality of smooth rollers of drive unit by friction.

10. The method according to claim 8, wherein the outer convex surface of the rigid pipe sections has threads or teeth that engages corresponding threads or teeth on a plurality of rollers of drive unit.

11. A rigid pipe as substantially hereinbefore described with reference to the accompanying drawings.

12. A method as substantially hereinbefore described.

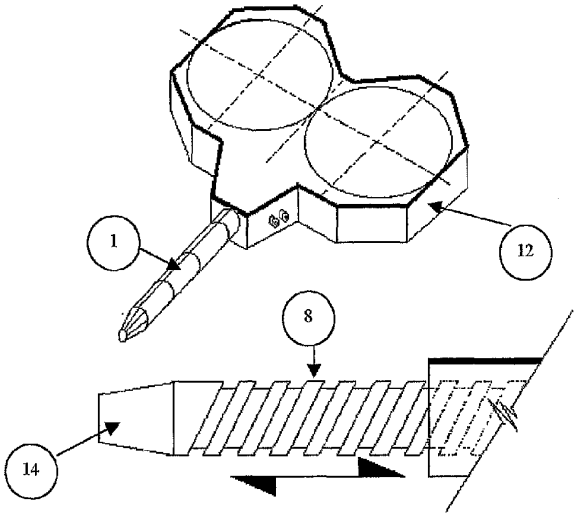


Fig.1

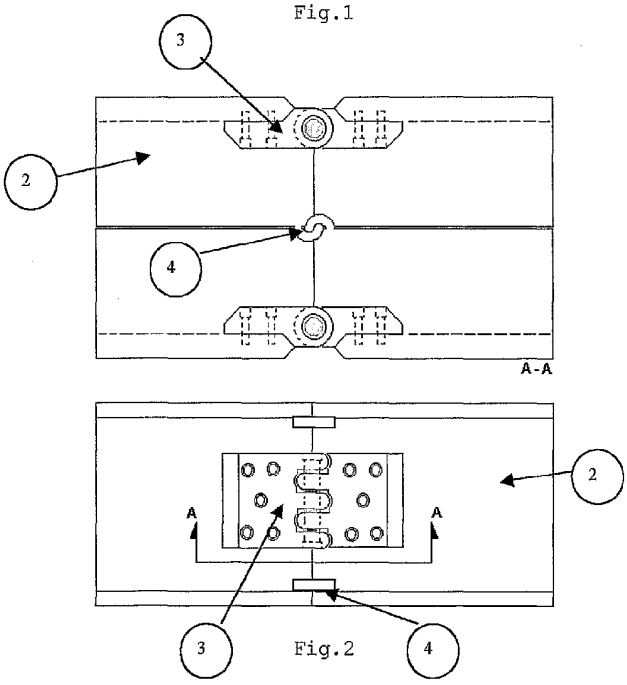


Fig.2

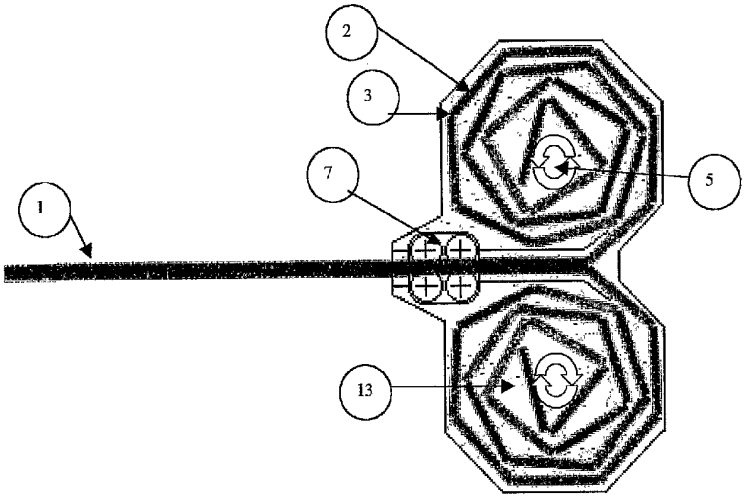


Fig.3

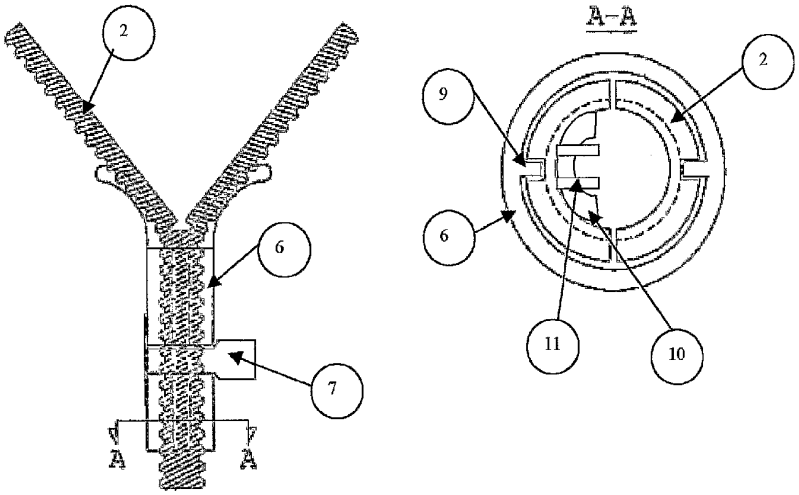


Fig.4