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(54) **CABLE PULLING SYSTEM AND A METHOD OF PULLING A CABLE USING THE SYSTEM**

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(57) **ABSTRACT**

The disclosure relates to a cable pulling system being used in a cable laying construction. The cable pulling system of the disclosure can pull a cable from a cable drum loaded on a trailer to an underground duct without unloading the cable drum from the trailer.

The cable pulling system comprises a cable drum rolling device configured to rotate the cable drum, a cable guider configured to guide the cable from the cable drum to the conduit, and a caterpillar configured to pull the cable guided through the cable guider from the cable drum and to convey the cable to an underground duct.

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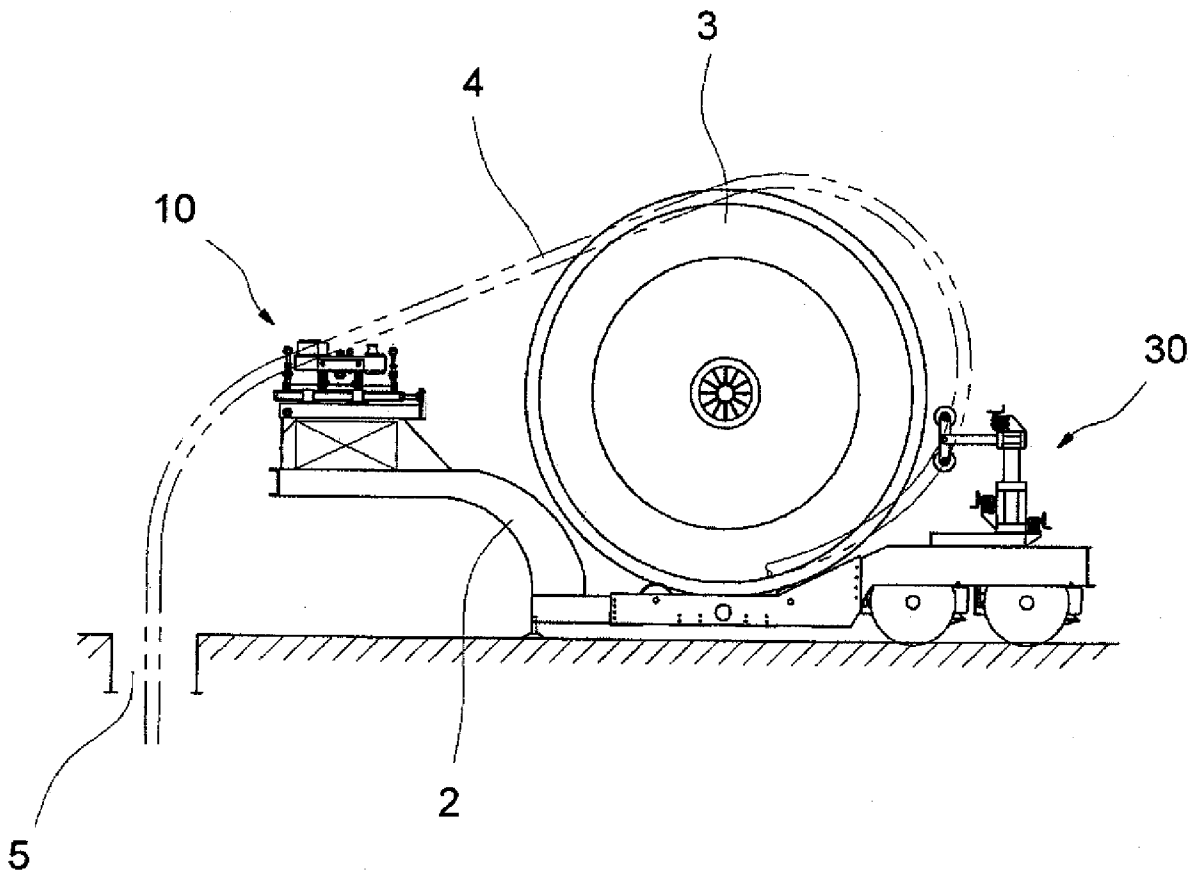


FIG. 1

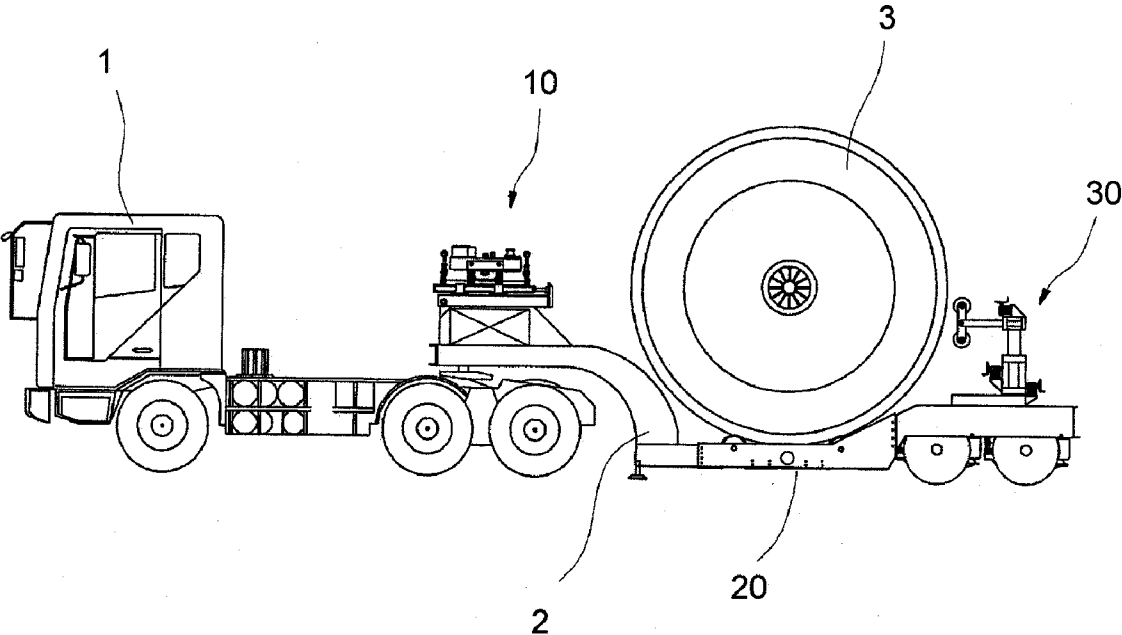


FIG. 2

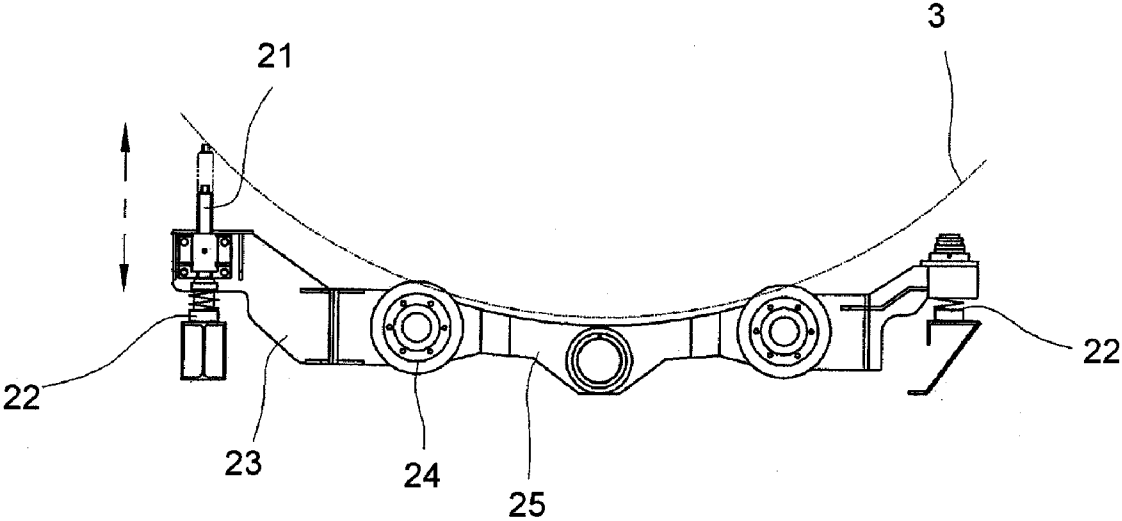


FIG. 3

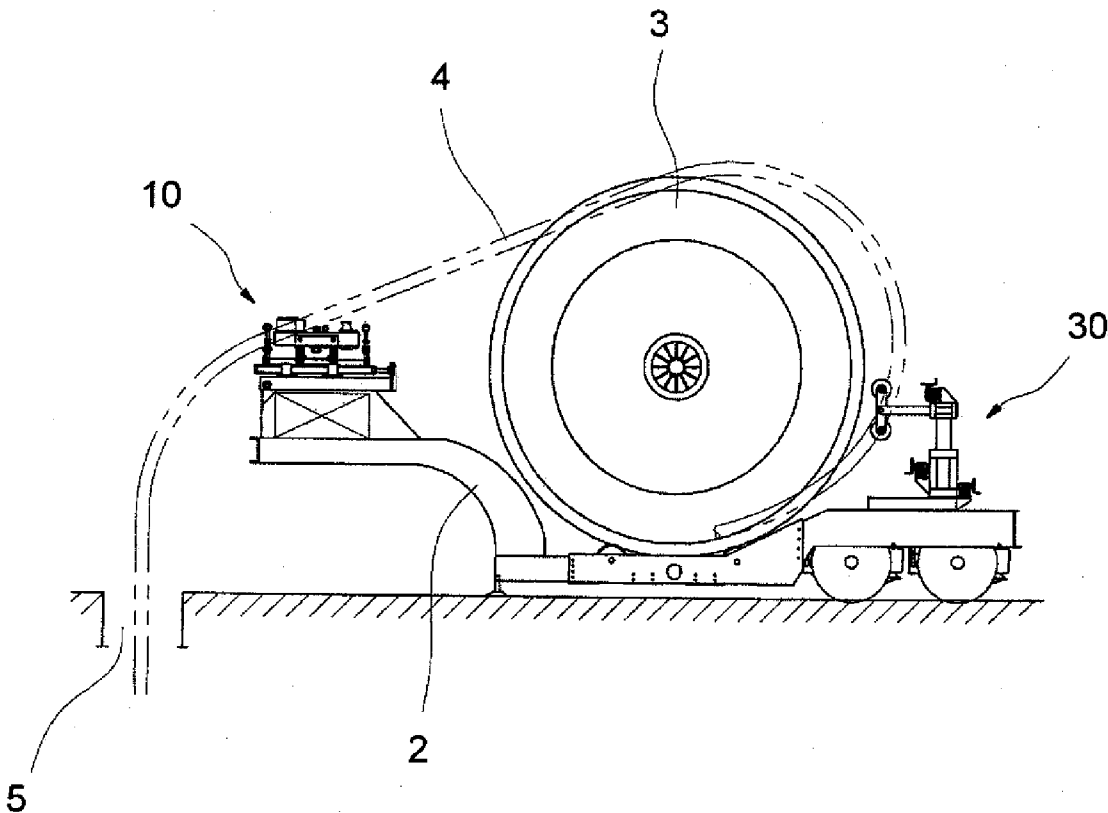


FIG. 4

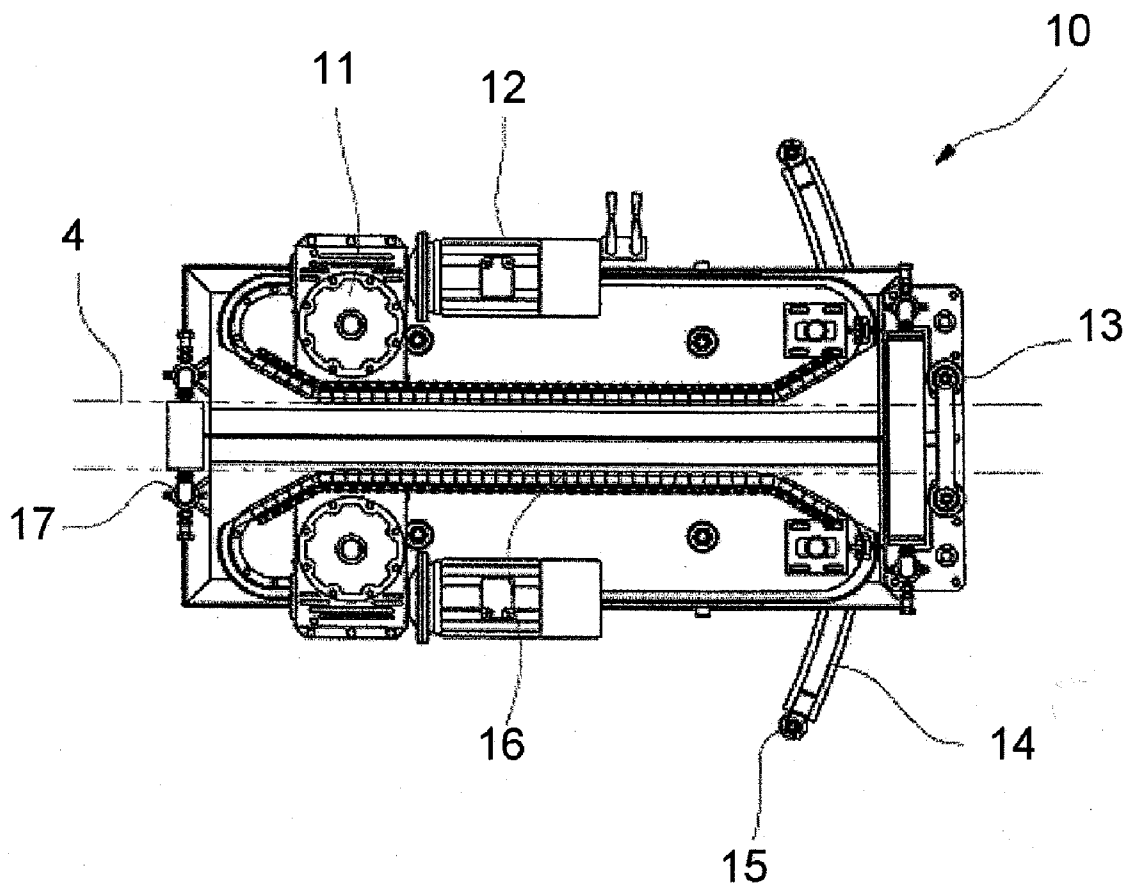


FIG. 5

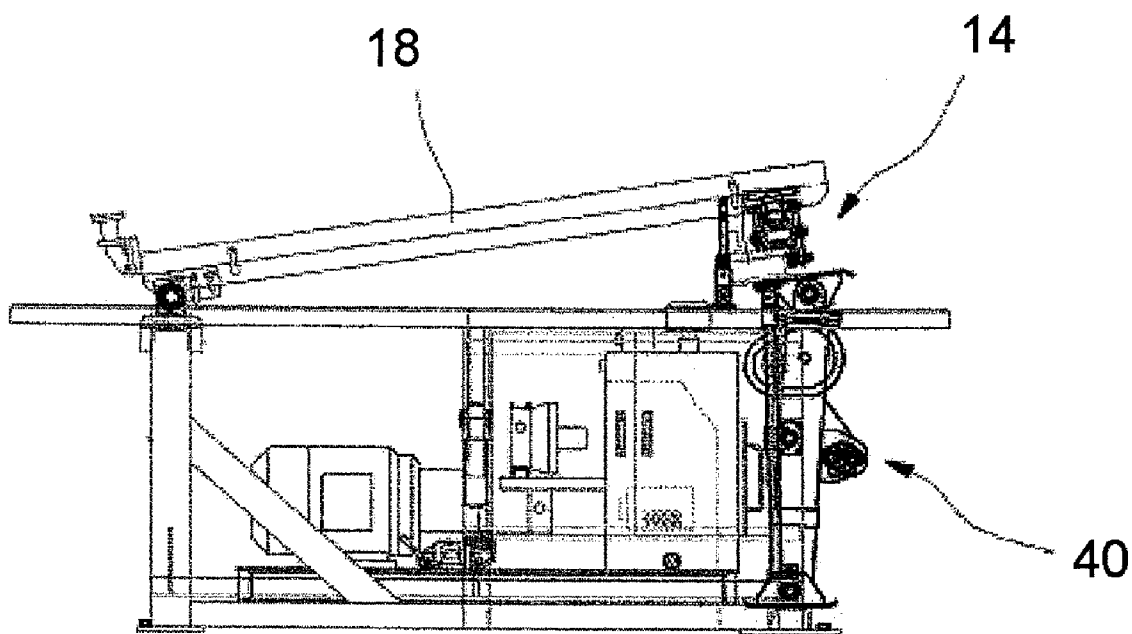
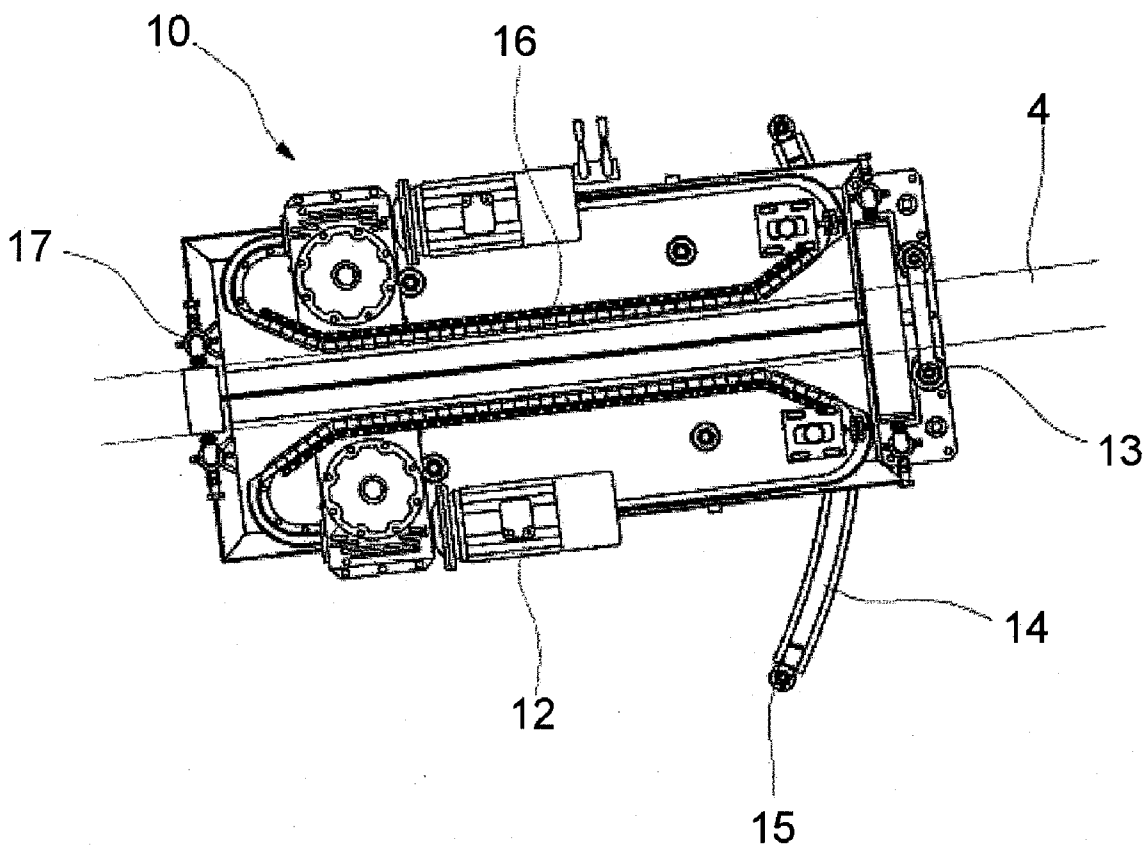


FIG. 6



CABLE PULLING SYSTEM AND A METHOD OF PULLING A CABLE USING THE SYSTEM

[0001] This application claims the benefit of the Korean Patent Application No. 10-2008-0021823, filed on Mar. 10, 2008, which is hereby incorporated by reference as if fully set forth herein.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to the installation of cable, more specifically, to a cable pulling system can pull a cable from a cable drum loaded on a trailer into an underground duct according to the installation velocity without unloading the cable drum from a trailer in loaded state.

[0004] 2. Discussion of the Related Art

[0005] In case of installation a cable into the underground according to the related art, the cable drum should be unloaded from a trailer. The cable is wound on a cable drum which is kind of a reel.

[0006] And then, the high voltage cable can be pulled from the cable drum. Therefore, loading the cable drum onto the trailer and unloading the cable drum from the trailer increase the time required and the necessary sum.

SUMMARY OF THE INVENTION

[0007] Accordingly, the present invention is directed to a cable pulling system that substantially obviates problem due to limitations and disadvantages of the related art.

[0008] An object of the present invention is to provide a cable pulling system can pull a cable without unloading a cable drum from a trailer.

[0009] Another object of the present invention is to provide a cable pulling system can reduce the installation time and the necessary sum.

[0010] Another object of the present invention is to provide a cable pulling system can pull a cable according to the installation velocity.

[0011] A further object of the present invention is to provide a cable pulling system can pull a cable according to the height of the cable pulled from the cable drum.

[0012] A further object of the present invention is to provide a cable pulling system can pull a cable according to the angle of the cable pulled from the cable drum.

[0013] To achieve these objects and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, a cable pulling system comprises a cable drum rolling device which rotates the cable drum on the trailer, a cable guider which guides the cable from the cable drum to the conduit, and a caterpillar which resolve a traverse caused by the changing of the direction and the height of the cable being unrolled from the cable drum.

[0014] A cable pulling system of the present invention can adjust a gradient of the cable pulled into the conduit.

[0015] A cable pulling system of the present invention can adjust the direction and the height of the cable into a caterpillar.

[0016] Preferably, the cable pulling system of the present invention can pull the cable to the conduit according to the installation velocity.

[0017] Preferably, the cable pulling system of the present invention can pull the cable according to the width of the cable drum.

[0018] Preferably, the cable pulling system of the present invention can pull the cable according to the various angles and the positions of the cable pulled from the cable drum.

[0019] It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

[0021] FIG. 1 shows a towed cable pulling system of the present invention.

[0022] FIG. 2 is a front view of cable drum rolling device of the present invention.

[0023] FIG. 3 is a front view of the preferred embodiment of the present invention.

[0024] FIG. 4 is a plane view of the preferred embodiment of the present invention.

[0025] FIG. 5 is a front view of the caterpillar solution device according to the present invention.

[0026] FIG. 6 is a plane view of the operational state of the caterpillar of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0027] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

[0028] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

[0029] FIG. 1 shows a towed cable pulling system of the present invention.

[0030] A cable drum (3) is loaded on a trailer (2) which is towed by a tow car (1). A caterpillar (10) is located on the upper front area of the trailer (2). The caterpillar (10) can be controlled by a remote controller (5). The cable drum (3) is supported by a cable drum rolling device (20). The cable drum rolling device (20) is located beneath the cable drum (3). The cable drum rolling device (20) fixes the cable drum (3) in transportation state and rolls the cable drum (3) in installation state. The tow car (1) carries the trailer (2) loading the cable drum (3) to working place. After arriving at the working place, the tow car (1) leaves the trailer (2) to working place. The trailer (2) is located at the duct structure which is the working place.

[0031] FIG. 2 is a front view of cable drum rolling device of the present invention. The cable drum rolling device (20) comprises stopper (21) and rollers (24). The stopper (21) fixes the cable drum (3) when the cable pulling system in condition of not operating. The stopper (21) fixes the cable drum (3) at

both sides in transportation state. The cable drum (3) can be moved when the stopper (21) releases the cable drum (3). The power of the motors (24) can roll the cable drum (3). A stopper (21) is installed at the one part of the roller body (25) with a spring cushion bracket (22) to fix the cable drum (8). Spring cushion holders (23) to support spring cushion, are installed at 4 spots of both sides of the roller body (25) to provide cushion to the roller body (25). The springs give elasticity to the cable drum (3). The rollers (24) support and roll the cable drum (3) with the power generated by at least one motor in installation state.

[0032] FIG. 3 is a front view of the preferred embodiment of the present invention.

[0033] The cable (4) wound on the cable drum (3) is pulled to the caterpillar (10) through the cable guider (30) when the motors (24) of the cable drum rolling device (20) roll. The caterpillar (10) pulls the cable (4) guided through the cable guider (30) from the cable drum (3) and conveys the cable (4) to an underground duct (5). A cable guider (30) guides the cable (4) unwound from the cable drum (3) rolled by the cable drum rolling device (20).

[0034] FIG. 4 is a plane view of the caterpillar according to the present invention. FIG. 5 is a front view of the caterpillar according to the present invention. FIG. 6 is a plane view of the operational state of the caterpillar of the present invention.

[0035] A caterpillar (10) is symmetrically installed on the upper frame (18) of a height adjuster (40) and pulls the cable (17). A gear speed reduction box (11) reduces the speed of the motor (12).

[0036] A first cable pulling roller (13) guiding the providing of the cable (4) is installed at the front area of the caterpillar (10). A second cable pulling roller (17) guiding the outputting of the cable (4) is installed at the rear area of the caterpillar (10).

[0037] The pulled cable from the cable drum (3) is guided toward to the first cable pulling roller (13). The cable (4) is conveyed by the engaged chain (16).

[0038] The height of the caterpillar (10) is adjusted by a height adjuster (40). A moving guide (14) is installed at the upper area of the height adjuster (40).

[0039] The caterpillar can freely move according to the angle and position of the unwound cable (4). Up and down movement and free movement is performed by the guidance of the moving guide (14).

[0040] The height adjuster (40) adjusts the height of the moving guide (14) with the upward and downward movement.

[0041] The moving guider (14) is located beneath the caterpillar (10) and guides the horizontal movement of the caterpillar (10) according to the direction of the unwound cable (4).

[0042] The height adjuster (40) is located beneath the moving guider (14) and adjusts the height of the caterpillar (10), wherein the height adjuster moves the caterpillar upward and downward according the height of the unwound cable.

[0043] The moving guider (14) is a kind of rail to guide the caterpillar (10), wherein the guide rail is curved like a border of a fan-shape and keeps the caterpillar and the unwound cable in a straight line.

[0044] The upper frame (18) is installed slopingly and the slant angle of the upper frame (18) is in the range of 5°~35°.

[0045] The caterpillar (10) is handled by a remote controller and pulls the cable by adjusting the speed according to the

cable pulling speed. The cable (4) being connected to the caterpillar (10) through the first cable pulling roller (13), is pulled by the caterpillar (10).

[0046] The power generated by the motor (12) is reduced by the gear speed reduction box (11) and provides the caterpillar (10) with the cable (4).

[0047] When the cable (4) is pulled from the center area of the cable drum (3), the caterpillar (10) and the cable (4) keep the state of the straight line without any problem. If the cable (4) is pulled with the tilted angle and direction toward the edge of the cable drum (3), the caterpillar (10) moves with rotation through the free moving device according the direction of the cable (4).

[0048] The moving guide (14) keeps the state of the straight line between the caterpillar (10) and the cable (4). The upper area of the guide rail is higher than the other area and has rounding type slope to move freely.

[0049] When the moving guide (14) freely moves according to the providing angle and the providing direction.

[0050] When the cable (4) moves through the moving guide (14), if the cable (4) keeps the straight line with the caterpillar (10), the direction has no change. However, when cable (4) is pulled through the cable drum (3), the providing height is changed. Therefore, the providing height could be changed according to the slant angle of the upper frame (18).

[0051] The cable (4) can be stably pulled to the caterpillar (10) by adjusting the height of the moving guide (14) according the height of the providing height. Simultaneously, the accurate height is pulled by the control of the height adjuster (40).

[0052] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the inventions. Thus, it is intended that the present invention covers the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

1-9. (canceled)

10. A cable pulling system for pulling a cable from a cable drum without unloading the cable drum from a trailer, comprising:

- a cable drum rolling device configured to fix the cable drum in a transportation state and to roll the cable drum in an installation state, wherein the cable drum rolling device is located beneath the cable drum;
- a cable guide configured to guide the cable unwound from the cable drum rolled by the cable drum rolling device; and
- a caterpillar configured to pull the cable from the cable drum, through the cable guide and to convey the cable to an underground duct.

11. The cable pulling system of the claim 10, wherein the cable drum rolling device comprises:

- at least one stopper configured to fix the cable drum at both sides in the transportation state; and
- at least one roller configured to support the cable drum and to roll the cable drum with power generated by at least one motor in the installation state;
- a pair of springs configured to give an elasticity to the cable drum.

12. The cable pulling system of the claim 10, further comprising:

a moving guide located beneath the caterpillar and configured to guide the horizontal movement of the caterpillar according to a direction of the unwound cable.

13. The cable pulling system of the claim **12**, further comprising:

a height adjuster located beneath the moving guide and configured to adjust the height of the caterpillar, wherein the height adjuster moves the caterpillar upward and downward according to a height of the unwound cable.

14. The cable pulling system of the claim **11**, wherein the moving guide comprises a guide rail configured to guide the caterpillar, wherein the guide rail is curved along an arc and keeps the caterpillar and the unwound cable in a straight line.

15. A method of pulling a cable during an installation of cabling, the method comprising:

loading a cable drum on a trailer towed by a tow car and fixing the cable drum;
transporting the trailer near an underground duct and unfixing the cable drum;

rolling the cable drum without unloading the cable drum from the trailer and unwinding the cable wound on the cable drum; and

pulling unwound cable with a caterpillar to convey the unwound cable to the underground duct.

16. The method of claim **15**, further comprising:
guiding the unwound cable to the caterpillar with a cable guide.

17. The method of claim **15**, further comprising:
adjusting the height of the caterpillar according to the height of the cable guided by the cable guide toward the caterpillar.

18. The method of claim **15**, further comprising:
adjusting the horizontal position of the caterpillar to keep a line between the unwound cable and the center of caterpillar straight.

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