Technical Field

The present invention relates to a device and method for feeding of flexible coils, and more particularly a device and method for feeding of flexible coils, for example flexible pipes.

Background of the Invention

Flexible pipes have many uses, in modern houses and buildings flexible pipes are e.g. used as water pipes for the main water supply to the house.

The way this is done today are by uncoiling a length of pipe, stretching it out and laying it into a ditch before connecting it to the main water supply. This is a very time consuming and costly way of working since is requires to or more people uncoiling and laying the pipe. It can also be very heavy and dirty work since working in a ditch when it is raining is not very pleasant.

A known solution to this problem is a U-shaped device onto which the coil of pipe is placed and the device and the coil are hoisted into the air using e.g. a digger or other large and heavy equipment.

The problem with this solution is that is mostly suited for larger sizes of pipes and it also requires large and heavy equipment which is expensive, requires qualified personnel and roads that can tolerate equipment of this size.

Further this solution is only suited when rolling out pipes, rolling it in again is not possible.

US 4949909 A is an example of an alternative solution. Here it is presented a pipe coil rack for dispensing pipes from a coil. The device is a frame having a turntable bearing, a cross bar, legs, wheels and a tongue. A turntable is rotatably mounted to the turntable bearing. Further a pipe guide 5 rings secured to the frame. The turntable includes a pipe reel hold down assembly secured to the turntable with a rubber strap and removable spacers secured to the turntable and to the pipe reel hold down assembly. The pipe coil dispensing rack may be positioned for use horizontally by positioning the wheels and the tongue on the ground, or the pipe coil dispensing rack may be positioned for storage vertically by positioning wheels and the cross bar on the ground.

This solution has several drawbacks. A drawback is that it has to be placed on the ground when dispensing the pipe, since it is not possible to hoist it into the air. A further problem is the open solution of the invention, wherein the coil of pipe is not

securely positioned. Even further, as stated in the application a form of engine is needed in order to uncoil the pipes.

The loading of the pipe is also very complicated in this solution.

EP 3260751 A1 describes a modular basket carousel system with wheels 9 supporting the basket and wherein the system can be lifted into position.

DE 202007016430 U1 describes a device for unreeling floor heating pipes from a mechanical device.

There are also a lot of solutions for smaller hoses and wires, but these solutions are not scalable since the loading of the devices are estimated as being doable for one person. The coils of wire or hoses can easily be lifted and handled by one person.

Summary of the Invention

It is therefore an object of the present invention, as stated in the set of claims to overcome the problems mentioned above.

The present invention is a device comprising two parts. There is an upper and a lower part. The upper part has two functions wherein one of them is to function as a lid securing the flexible coils. The other function is to work as a guide for the flexible coils.

The lower part of the device functions as a cradle for the flexible coils. When the upper part is off, the flexible coil is placed in the cradle portion of the lower part. The cradle is attached to a central hub. The central hub can be a hollow tube. On top of the central portion there is a plate. Through this plate there is attached swivel. To this swivel there is attached a lifting arrangement. This lifting arrangement can be a ring from which the entire device can be hoisted. The swivel makes it possible for the lower part of the device to rotate freely in either direction relative to the lifting arrangement and the upper part of the device.

When the upper part of the device is placed on top of the lower part of the device the e.g. coil of flexible pipe can be guided through the guide for the pipe which is placed on top of the upper part. By pulling on the pipe the bottom part of the device rotates while the upper part stays in place.

Since the cradle of the lower part can rotate freely in either direction while the upper part works as a guide for the pipe the present invention can be operated by a single person. He or she can pull out as much pipe as needed without having to

uncoil it first. Further since the cradle can rotate in either direction it is also possible to push the pipe in again if needed.

As an alternative solution the device can also be placed on a rack or a stand. The rack is placed on the ground or a floor. The rack has a central spindle which fits into an opening in the bottom of the central hub. The spindle connects with the central hub. This allows the cradle to function as a turntable. A benefit with this solution is that the device can be operated without the use of heavy equipment for hoisting the device up in the air.

Further this rack can have several levels which allows for stacking more than one device. By doing this e.g. pipes of more than one dimension can be available at one time.

Brief Description of the Drawings

The invention will now be described in details in reference to the following drawings, wherein;

Figure 1 is a perspective view of an embodiment of the upper part of the present invention;

Figure 2 is a perspective view of an embodiment of the lower part of the present invention;

Figure 3 is a perspective view of the combination of the upper and lower part of the present invention;

Figure 4 is a cross sectional view of an alternative solution to the present invention with the flexible pipes placed in the lower part of the present invention;

Figure 5 is a top view of the alternative solution presented in figure 4;

Figure 6 is a perspective view of a stand for the solution presented in figure 3;

Figure 7 is a perspective view of the present invention placed on the stand presented in figure 6;

Figure 8 is a perspective view of a stand with the capability to store three units of the present invention; and

Figure 9 is a perspective view of three units of the present invention placed in the stand presented in figure 8.

Detailed Description

Figure 1 is a perspective view of an embodiment of the upper part of the present invention. The upper part comprises a central portion 1. The central portion 1 has an opening in the middle. This opening allows access to the central hub 10 of the lower part of the device. A pair of handles 2 is attached on top of the central portion 1. These handles 2 are for lifting the upper part.

A set of bars 3 is attached to the central portion 1. These bars 3 extend outwards from the central portion 1. The number of bars 3 attached to the central portion 1 can vary, but there must be at least three. The bars 3 can extend further out than the rim 8 of the lower part.

There is attached a wheel or a roller 4 to each of the bars 3. These wheels or rollers 4 rotate and rest against the rim 8 of the lower part of the device. These wheels or rollers 4 are the only contact point between the upper and the lower part of the device. The rollers 4 can have a U- or V-shaped groove that fits against the rim 8.

A guide 5 is attached to at least one of the bars 3. This guide 5 is in the form of a circle. The pipe is guided through this guide 5. Rollers 4 can be fitted on this guide 5 in order to ensure that the pipe passes more easily through the guide 5.

The bars 3 can be hinged 6 at the attachment point to the central portion 1. This allows for the rollers 4 to be pressed against the rim 8 of the lower part of the device. The movement of the bars 3 can from 5° - 90°. More preferably 5° - 30° and most preferably 10° - 20°.

Figure 2 is a perspective view of an embodiment of the lower part of the present invention. The lower part comprises a central hub 10. The central hub 10 can be a hollow tube. On top of the central portion 1 there is a plate. Through this plate there is attached swivel. To this swivel there is attached a lifting arrangement 7. This lifting arrangement 7 can be a ring from which the entire device can be hoisted. The swivel makes it possible for the lower part of the device to rotate freely in either direction relative to the lifting arrangement 7 and the upper part of the device.

As an alternative embodiment the lifting arrangement 7 can be connected to the central hub 10 via a set of ball bearings. This will also allow the lower part of the device to rotate freely in either direction independently of the upper part of the device.

To the outside of the central hub 10 there is attached a second set of bars 9. These second set bars are, at one end, attached to the upper part of the outside of the

central hub 10. The first part of the second set of bars 9 extends outwards from the central hub 10. They can also be slanting slightly downwards. The second part of the second set of bars 9 is U-shaped. The second end of the second set of bars 9 is attached to a circular bar, herein after called the rim 8. The number of the second set of bars 9 in the lower part of the device can vary, but there must be at least two.

The second set of bars 9 creates a cradle. The coil of flexible pipe is placed in this cradle. As the first part of the second set of bars 9 extend outwards from the central hub 10 before they create a U-shaped cradle, they ensure that the coil of flexible pipes do not shift while it is placed in the device.

As an alternative embodiment the central hub 10 could have a wider circumference and the second set of bars 9 could be attached to the bottom part of the outer portion of the central hub 10. The second set of bars 9 could then have an L-shape.

As an even further alternative embodiment, the second set of bars 9 could be replaced with e.g. sheet metal, or similar material creating the cradle.

To the first part of each of the second set of bars 9 there is attached a stopper 11. This stopper 11 extends upward to ensure that the flexible pipe do not wedge itself between the upper and the lower part of the device. These stoppers 11 can be bars or they can e.g. be wheels or rollers 4.

The central hub 10 has a top portion onto which there is attached a lifting arrangement 7. This lifting arrangement 7 can be a ring from which the entire device can be hoisted.

Figure 3 is a perspective view of an embodiment of the entire device of the present invention. In this figure the upper part of the device is placed on top of the lower part of the device. Here it can be seen that the roller 4 on the bars of the upper part of the device rests against the rim 8 of the lower part. In a preferred embodiment of the present invention, this is the only places of contact between the upper and the lower part of the device.

Figure 4 is a cross sectional view of an alternative embodiment of the present invention with the flexible pipes 18 placed in the lower part of the device. The flexible pipes 18 are guided from the lower part of the device between two bars 3 of the upper part of the device and through the guide 5 shown in figure 1 and 3. The device can be either placed on a stand or hoisted into the air by the lifting arrangement 7. The device is now ready for use.

When the device is ready for use a user can pull on the piece of pipe guided through the guide 5. The bottom part of the device will start to rotate while the upper part of the device will be held in place by the pipe. The rollers 4 and either the swivel or the bearings in the stand 12 will ensure that the bottom part rotates easily relative to the upper part.

If the user pushes on the flexible pipe 18 while holding the upper part, the bottom part of the device will rotate in the opposite direction and the pipe will be fed into the device.

It is further shown in this embodiment of the present invention that the central hub 10 is shorter. This has no effect on how the device operates.

Figure 5 is a top view of the alternative embodiment presented in figure 4. Here it is shown that the pipe 18 is guided between two bars 3 of the upper part of the device and through a guide 5 attached on top of one of the bars 3 of the upper part of the device.

Figure 6 is a perspective view of a stand for the embodiment presented in figure 3. As shown the stand has a set of feet 13 extending outwards from a centre. The feet 13 extend outwards in different directions to give a firm base that is stable in all directions. The number of feet 13 can vary from three and upwards. At the centre there is a spindle 12. The central hub 10 attaches to this spindle 12.

As a solution the spindle 12 can rotate freely in either direction independent of the feet 13 of the stand. In this embodiment the outer part of the central hub 10 of the lower part of the device is in rests on the spindle 12.

In an alternative embodiment the spindle 12 connects to the central hub 10 and thus allows the lower part of the device to rotate freely in either direction relative to the upper part of the device and the stand.

Figure 7 is a perspective view of the present invention placed on the stand presented in figure 6. Here it is seen how the central hub 10 of the lower part of the device is placed on the spindle 12 of the stand.

Figure 8 is a perspective view of a stand with the capability to store three units of the present invention. In this embodiment the stand has the capability to store three units of the device. The stand has a set of feet 15, 16 ensuring stability. To the end of one of the feet 15 there is attached a first leg 17. This leg 17 extends upwards. To this leg 17 there are attached a second and third leg 14. These legs extend outwards from the first leg 17. The second and third legs 14 are placed

above each other. The distance between the second and third leg 14 allows a unit of the present invention to be placed between them. To the end of the second and third leg 14 there are placed a spindle 12 like the one described in figure 6.

Figure 9 is a perspective view of three units of the present invention placed in the stand presented in figure 8.

Claims

1. A device for feeding of flexible pipes c h a r a c t e r i s e d i n that it comprises an upper part and a lower part wherein the upper part can be placed on top of the lower part, the upper part comprises a central portion (1), at least three bars (3) are attached to the central portion (1), these bars (3) extend outwards from the central portion (1), the bars (3) are hinged (6) to the central portion (1), there is attached a wheel or a roller (4) to each of the bars (3), a guiding ring (5) for the flexible pipe is attached to the top of at least one of the bars (3), the lower part comprises a central hub (10), the central hub (10) has a top plate, to this top plate there is attached a lifting arrangement (7), this lifting arrangement (7) is attached to a swivel, this swivel allows the lower part of the device to rotate freely in either direction relative to the upper part of the device and the lifting arrangement (7), a second set of bars (9) is attached at one end to the central hub (10), wherein the bars has a first and a second portion, the first portion extends outwards from the central hub (10) and the second portion is U-shaped, the U-shaped portion of the second set of bars (9) creates a cradle in which the flexible pipes rest, the second set of bars (9) are at a second end attached to a rim (8) of the lower part of the device, wherein the wheels or rollers (4) rest against the rim (8) on the lower part of the device when the upper part of the device is placed on top of the lower part of the device.

2. A device according to claim 1 wherein the central portion (1) has an opening in the centre allowing access to the lifting arrangement (7) on the top of the central hub (10) of the lower part of the device.

3. A device according to claim 1 wherein the central portion (1) has a set of handles (2) for lifting the upper part of the device.

4. A device according to claim 1 wherein the upper part of the device is held in place on top of the lower part of the device by gravity pushing the rollers (4) against the rim (8).

5. A device according to claim 1 wherein the rollers (4) can have a U- or V-shaped groove that fits against the rim (8).

6. A device according to claim 1 wherein the angle of the bars (3) at the hinge (6) is restricted to only move vertically between 5° and 90° below the

horizontal plane, more preferably between 5° and 30° below the horizontal plane, and most preferably between 10° and 20° below the horizontal plane.

7. A device according to claim 1 wherein the weight of the upper part of the device and the angle of the bars (3) results in a force with a horizontal component between the wheels or rollers (4) and the rim (8), holding the upper part of the device in place on top of the lower part of the device.

8. A device according to claim 1 wherein the second set of bars (9) can be replaced with panels of sheet metal.

9. A device according to claim 1 wherein each bar of the second set of bars (9) has a stopper (11) attached to it to prevent the flexible pipe from wedging between the upper and the lower part of the device.

10. A device according to claim 1 wherein the upper part of the device and the lower part of the device are in contact with each other via the wheels or rollers (4) resting on the rim (8) of the lower part of the device.

11. A device according to claim 1 wherein said device can be placed on a stand wherein the stand has a spindle (12) that the central hub (10) is placed upon.

12. A device according to claim 11 wherein the spindle (12) can be attached to the rest of the stand via a set of bearings allowing it to rotate freely in either direction.