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A DRAINING DEVICE FOR WEAK GROUND

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a draining device for weak ground that makes paper clamped for the purpose of draining water from the weak ground such that the paper can absorb and discharge the water from the weak ground, wherein a casing can be ascended and descended in a more stable manner and tension for wires can be controlled in a simple way.



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2. Description of the Related Art

So as to drain weak ground, typically, paper that is made of a fiber material having a heart material of a synthetic resin is forcedly inserted into the weak ground and serves to absorb the water from the weak ground. A conventionally developed draining device for the weak ground is formed in such a manner that a casing going up and down by the connection with a crane is connected to a guide supporter fixedly mounted on the crane. Wire holders, which connect the wires connected to driving parts for operating the casing, are adapted to be mounted on the front side of the casing, such that upon raising of the casing, the wires on the eccentric position from the center of the raising make the casing operated. This causes the casing to lean back or forth, not in an accurately vertical direction. Thereby, the casing exhibits a substantially low durability.

In addition, in case of using the wires for a substantially long term, they tend to be a little expanded. At this time, they need to be adjusted in their tension. However, the conventional draining device does not have any means for adjusting the tension of the wires. Thereby, it takes much time to control the

tension of the wires. Accordingly, the present inventor has studied the draining device for weak ground (which was issued as Korean Utility Model Registration No. 180865), and hereinafter, it will be described with the accompanying drawings.

FIG. 1 is a front view showing a draining device for weak ground as conventionally used, FIG. 2 is a perspective view showing the principal parts of the draining device of FIG. 1, FIG. 3 is a sectional view showing the clamp on the lower end portion of the casing of the draining device of FIG. 1, and FIG. 4 is a perspective view showing the driving parts for driving the wires of the draining device of FIG. 1. A draining device 1 for weak ground having a casing 2 that is guided up and down by a guide supporter 9, with having a paper insertion hole 11 through which paper 10 is forcibly inserted to absorb the water from the weak ground, and driving parts 6 for operating the casing 2 upwardly and downwardly, characterized in that the casing 2 is provided with a connecting piece 2a to fix holders 3 on the left and right sides thereof, wires 4 connected to the upper and lower positions that are the same as a casing center-line P of the holders 3, on the one ends thereof and to upper and lower wire drums 16 and 17 of the driving parts 6 that are disposed on the left and right sides of the guide supporter 9 through guide rollers 21 that are mounted by a shaft on the upper and lower parts of the guide supporter 9, on the other ends thereof, chain sprockets 18 are disposed on the same axes as the wire drums 16 and 17 and connected by a chain 19, an oil pressure motor 20 forwardly and backwardly driven is disposed on the one side of one of the wine drums 16 and 17, such that the wires 4 are connected to the upper and lower positions that are the same as the casing center-line P of the holders 3, which enables the holders 3 to be moved vertically along the guide

supporter 9. However, the wires 4 tend to be substantially expanded due to long term usage. In this case, the chain sprockets 18 connected by the chain 19 are appropriately provided to adjust the tension of the wires 4, but it is just found that the chain 19 is broken due to the overload applied thereto.

SUMMARY OF THE INVENTION

To solve the above-described problems, it is an object of the present invention to provide a draining device for weak ground that is provided with wire drums disposed on the left and right sides from the center of a casing, such that they operate the casing 2 upwardly and downwardly as wires 4 move forwardly and backwardly, the one side ends of the wires fixed on the both side ends of the wire drums and the other side ends of the wires fixed on the upper and lower portions of holders on the casing through guide rollers disposed on the upper and lower sides of a guide supporter, and guide rollers on the lower end of the guide supporter are ascended and descended by tension adjusting parts to control the tension of the wires upon expansion, whereby the problem that the casing leans back or forth is solved, the durability of the casing is improved, and the tension of the wires is controlled in a simply manner.

To accomplish this and other objects of the present invention, there is provided a draining device for weak ground having a casing that is guided up and down by a guide supporter, with having a paper insertion hole through which paper is forcedly inserted to absorb the water from the weak ground, and driving parts for operating the casing upwardly and downwardly, characterized in that the casing is formed integrally with holders that are disposed on the same position as the center-line P of the casing, on the left and right sides of the top end thereof,

each of the holders connected to the one end of a wire on the upper and lower sides thereof, the other ends of the wires connected to the upper sides of the holders are fixed on the one side ends of wire drums of the driving parts disposed on the left and right sides of the guide supporter, through guide rollers that are mounted by a shaft on the upper and lower portions of the guide supporter, and the wires connected to the lower sides of the holders are fixed on the other side ends of the wire drums of the driving parts, through guide rollers that are mounted by a shaft on the lower end of the guide supporter and are ascended and descended by tension adjusting parts, each of the wire drums having a spiral reentrant groove for guiding the wire on the surface thereof and an oil pressure motor driven forwardly and backwardly for driving the wire drum.

BRIEF DESCRIPTION OF THE DRAWINGS

Further objects and advantages of the invention can be more fully understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a front view showing a draining device for weak ground as conventionally used;

FIG. 2 is a perspective view showing the principal parts of the draining device of FIG. 1;

FIG. 3 is a sectional view showing the clamp on the lower end portion of the casing of the draining device of FIG. 1;

FIG. 4 is a perspective view showing the driving parts for driving the wires of the draining device of FIG. 1;

FIG. 5 is a front view showing a draining device for weak ground

according to the present invention;

FIG. 6 is a perspective view showing the principal parts of the draining device of FIG. 5;

FIG. 7 is a perspective view showing the driving parts for driving the wires of the draining device of FIG. 5; and

FIG. 8 is a sectional view showing the wire drums of the draining device of FIG. 5.

DETAILED EMBODIMENT OF THE PRESENT INVENTION

Now, an explanation of the preferred embodiment of the present invention will be described with reference to accompanying drawings.

FIG. 5 is a front view showing a draining device for weak ground according to the present invention, FIG. 6 is a perspective view showing the principal parts of the draining device of FIG. 5, and FIG. 7 is a perspective view showing the driving parts for driving the wires of the draining device of FIG. 5. In this preferred embodiment, the same reference numerals indicate the same elements as the above-mentioned conventional device.

A guide supporter 9 includes a generally rectangular frame and is fixedly mounted on the one side of a crane 7 by means of connecting rods 8. A casing 2 has a generally lozenge shape as viewed from its plane and is mounted into the guide supporter 9 such that it is ascended and descended as guided by the guide supporter 9. The casing 2 is provided with a coupling hole 11 that is passed through the upper and lower portions thereof, through which paper 10 is inserted and coupled. The casing 2 is provided with a clamp 5 for clamping the paper 10 on the lower end thereof, and the clamp 5 has a paper coupling pin 12 such that

the pin 12 coupled with the paper 10 is locked into a pin locking hole 13 that is formed on the bottom end of the casing 2.

The casing 2 is formed integrally with holders 3 that are connected to driving parts 6 for driving the casing 2, on the left and right sides thereof of the upper end thereof. Each of the holders 3 is provided with a wire clamp 15 on the upper and lower portions thereof, respectively, and in this case, each of the wire clamps 15 is fixed to correspond with the center-line P of the casing 2.

On the other hand, the driving parts 6 for driving the casing 2 are disposed on the left and right sides of the guide supporter 9, and as shown in FIGS. 7 and 8, wire drums 16 that are driven by an oil pressure motor 20 are provided with a spiral reentrant groove 16a on their surface. The end parts of the wires 4, which are fixed on the upper side wire clamps 15 of the holders 3 through guide rollers 21 that are formed on the upper and lower sides of the guide supporter 9, are fixed on the one side ends of the spiral reentrant grooves 16a of the wire drums 16.

The end parts of the wires 4, which are fixed on the lower side wire clamps 15 of the holders 3 through guide rollers 24 that are mounted on the lower end of the guide supporter 9 and are ascended and descended by tension adjusting parts 23, are fixed on the other side ends of the spiral reentrant grooves 16a of the wire drums 16.

A reference numeral 4a denotes a wire fixing element, and 22 denotes a staple.

The draining device 1 for weak ground according to the present invention, as constructed above, is used to drain the water from the weak ground, and now, an explanation of operation and effect of the draining device 1 will be given.

To couple the paper 10 with the draining device 1 according to the present

invention, the paper 10 is inserted into the casing 2 through the coupling hole 11 from the top portion of the casing 2 until it is passed through the clamp 5 on the bottom end of the casing 2. As shown in FIG. 3, then, the paper 10 is rolled on the pin 12 and is fixed by means of the staple 22. After that, if the paper 10 pulls from the upper side thereof, the pin 12 that has been coupled with the paper 10 is locked into the pin locking hole 13 on the clamp 5 of the lower end of the casing 2. Thereby, the coupling of the paper 10 with the draining device 1 is completely finished.

In this state, if the oil pressure motors 20 of the driving parts 6 on the left and right sides of the guide supporter 9 operate in a forward direction, the wire drums 16 rotate such that the wires 4 connected to the upper sides of the holders 3 are unrolled from the wire drums 16, and contrarily the wires 4 connected to the lower sides of the holders 3 are rolled on the wire drums 16. This causes the holder 3 and the casing 2 coupled thereto to be descended.

As the casing 2 is descended to the weak ground, the paper 10 clamped by the casing 2 serves to absorb the water from the weak ground.

Next, if the oil pressure motors 20 operate in a backward direction, the holders 3 connected by the wires 4 to the wire drums 16 and the casing 2 clamped to the holders 3 are ascended, and the paper 10 discharges the water from the weak ground, in the state of putting into the weak ground. Like this, plural pieces of paper are used to absorb and discharge the water from the weak ground.

Since the spiral reentrant groove 16a is formed on the wire drum 16, at this time, the wire 4 is rolled or unrolled along the spiral reentrant groove 16a. Therefore, the wire 4 is not deviated from the wire drum 16, which helps the operation of the device with reliability.

When the casing 2 operates by the forward and backward driving of the oil pressure motors 20 of the driving parts 6, the wires 4 are connected to the holders 3 connected to the casing in order to correspond with the center-line P of the casing 2, such that the casing 2 does not lean back or forth upon operation.

In case of using the wires 4 for a relatively long term, generally, the wires 4 tend to be expanded. At this time, if the tension adjusting parts 23 on the lower end of the guide supporter 9 are descended, the wires 4, which are passed through the guide rollers 24 ascended and descended by the tension adjusting parts 23, are descended by the length of wire expanded. Thereby, the adjustment of the tension of the wires 4 can be completely finished.

That is to say, when the casing 2 is descended, the wires 4 that are connected to the lower sides of the holders 3 out of the wires 4 on the wire drums 16 droop from the wire drums 16 by the action of gravity. At this time, if the tension adjusting parts 23 on the guide rollers 24 operate, it compensates for the drooping wires such that the wires 4 cannot be deviated from the wire drums 16.

Industrial applicability

As set forth in the foregoing, the draining device 1 for weak ground according to the present invention that is capable of absorbing water from the weak ground by using the paper 10 is provided with the wires 4 that are connected from the upper and lower sides of the top portions of the holders 3 of the casing 2 to the driving parts 6 in order to correspond with the center-line P of the casing 2, such that the casing 2 does not lean back or forth, thereby enabling the durability of the casing to be enhanced. In addition, the device 1 is provided with the tension adjusting parts 23 that can control the length of wire expanded

due to a long term usage, and the wire drums 16 that are disposed on the left and right sides of the guide supporter 9, for operating the casing 2 in a more stable manner, and with the spiral reentrant groove 16a on each of the wire drums 16, for preventing the deviation of the wire 4, thereby achieving a high operation reliability.

While the present invention has been described with reference to a few specific embodiments, the description is illustrative of the invention and is not to be construed as limiting the invention. Various modifications may occur to those skilled in the art without departing from the true spirit and scope of the invention as defined by the appended claims.

Claims

1. A draining device (1) for weak ground having a casing (2) that is guided up and down by a guide supporter (9), with having a paper insertion hole (11) through which paper (10) is forcibly inserted to absorb the water from the weak ground, and driving parts (6) for operating the casing (2) upwardly and downwardly, characterized in that the casing (2) is formed integrally with holders (3) that are disposed on the same position as the center-line (P) of the casing (2), on the left and right sides of the top end thereof, each of the holders (3) connected to the one ends of wires (4) on the upper and lower sides thereof, the other ends of the wires (4) connected to the upper sides of the holders (3) are fixed on the one side ends of wire drums (16) of the driving parts (6) disposed on the left and right sides of the guide supporter (9), through guide rollers (21) that are mounted by a shaft on the upper and lower portions of the guide supporter (9), and the wires (4) connected to the lower sides of the holders (3) are fixed on the other side ends of the wire drums (16) of the driving parts (6), through guide rollers (24) that are mounted by a shaft on the lower end of the guide supporter (9) and are ascended and descended by tension adjusting parts (23), each of the wire drums (16) having a spiral reentrant groove (16a) for guiding the wire (4) on the surface thereof and an oil pressure motor (16) driven forwardly and backwardly for driving the wire drum (16).