

CASING ROTATOR

BACKGROUND

5 1. Technical Field

The present invention relates generally to a casing rotator, and more particularly to a casing rotator that has a structure in which a casing can selectively enter and exit the casing rotator because one side of a lower frame is open.

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2. Description of the Related Art

In general, a rotator is equipment that is widely used for foundation construction, and is one of various types of equipment used to press or draw out a casing into or from the
15 ground.

In general, when a stratum is unstable, it is necessary to, in order to prevent the collapse of a hollow wall, insert a casing to the depth of foundation excavation, pour concrete and then draw out the casing. A casing rotator is also used
20 to draw out a casing inserted into the ground or the bottom of the sea.

Examples of the configuration and use of such casing rotators are disclosed in Korean Patent Nos. 10-1536302 (entitled "Casing Rotator) and 10-0758113 (entitled "Method of
25 Installing Large-diameter Piles in Underwater Bedrock Using

Casing Rotator).

However, in the related arts, the casing rotator is configured to be sealed in all directions and surround a casing in all directions. Accordingly, in order to install or
5 move the casing rotator, the casing rotator needs to be lifted and moved by a crane. In other words, in order to draw out a casing inserted into the ground, it is necessary to lift the casing rotator with a crane or the like, lower the casing rotator from a location above the casing, and then place the
10 casing in the center of the casing rotator.

As described above, in the related arts, in order to place the casing rotator to surround the periphery of a casing inserted into the ground or move the casing rotator from the casing, it is necessary to lift the overall heavy casing
15 rotator with a crane or the like and then place it around the casing or to separate the casing rotator from the casing. Therefore, many problems arise in that the work is difficult and there is a risk of a safety-related accident.

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SUMMARY

The present invention has been conceived to overcome the above-described problems of the related arts, and an object of the present invention is to provide a casing rotator that is
25 configured to allow a casing to selectively enter and exit the

casing rotator because one side of a lower frame is open.

Another object of the present invention is to provide a casing rotator in which a crane bridge provided in the casing rotator is configured to be rotatable (openable) such that
5 interference with a casing is prevented when the casing rotator moves horizontally.

Another object of the present invention is to provide a casing rotator in which a casing is securely fixed by an opening/closing means and a reinforcing frame provided on one
10 side of a lower frame.

According to an aspect of the present invention, there is provided a casing rotator that has a structure in which at least one side of a lower portion is open. Accordingly, a casing may enter and exit through the lower portion of the
15 casing rotator.

In the casing rotator according to the present invention, a crane bridge is installed to be rotatable (openable). Accordingly, interference of the crane bridge is prevented when the casing rotator moves horizontally.

20 In the present invention, a reinforcing frame is further provided on the crane bridge.

According to the present invention, there is provided a casing rotator including: a clamping assembly configured to clamp a casing; and a lower assembly provided under the
25 clamping assembly, and configured to selectively fix the

casing; wherein the lower assembly is provided with a lower frame having one open side.

A lower clamping means and lower opening/closing means configured to fix the casing passing through the lower frame
5 vertically may be provided on one side of the lower frame, and may selectively press and fix the casing.

A bridge configured to be connected to a crane may be rotatably installed on the one open side of the lower frame; and an avoidance space configured to prevent interference with
10 the casing when the rotator moves horizontally may be formed in the bridge.

The lower clamping means may include first and second clamping members configured such that first ends thereof are rotatably installed on the lower frame, and a lower clamping
15 cylinder configured to connect the other ends of the first and second clamping members to each other; and the lower opening/closing means may include first and second opening/closing means symmetrically installed on the lower frame in a pair, and configured to selectively open and close
20 at least parts of the one open side of the lower frame.

The bridge may include a pair of connection rods formed to extend from the one open end of the lower frame, and a connection end configured to connect the outer ends of the pair of connection rods to each other; and a reinforcing
25 member may be installed between the pair of connection rods

across the avoidance space.

BRIEF DESCRIPTION OF THE DRAWINGS

5 The above and other objects, features, and advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a front view showing the configuration of a casing rotator according to an embodiment of the present invention;

FIG. 2 is a view taken along line A-A' of FIG. 1;

FIG. 3 is a partial plan view showing a state in that the casing rotator shown in FIG. 2 is coupled to a crane;

15 FIG. 4 is a view taken along line B-B' of FIG. 1;

FIG. 5 is a partial plan view showing the configuration of a lower assembly constituting a part of an embodiment of the present invention;

FIG. 6 is a view taken along line C-C' of FIG. 5;

20 FIG. 7 is a view taken along line D-D' of FIG. 5;

FIG. 8 is a partial plan view showing a state in which a casing is surrounded by the opening/closing means of the lower assembly constituting the part of the embodiment of the present invention;

25 FIG. 9 is an operational flowchart showing the process of

inserting a casing through the casing rotator according to the present invention;

FIG. 10 is a partial side view showing a state in which work is performed through the open portion of the lower
5 assembly constituting the part of the embodiment of the present invention;

FIG. 11 is a partial plan view showing a state in which work is performed through the open portion of the lower assembly constituting the part of the embodiment of the
10 present invention;

FIG. 12 is an operational flowchart showing a state in which the casing rotator according to the present invention moves after the casing has been inserted into the ground;

FIG. 13 is an operational flowchart showing the process
15 of drawing out a casing inserted into the ground by the casing rotator according to the present invention;

FIG. 14 is a flowchart showing a process in which the casing rotator according to the present invention approaches or moves away from a casing inserted into the ground; and

20 FIG. 15 is a partial plan view showing a process in which a casing is fixed by the lower assembly constituting the part of the embodiment of the present invention.

DETAILED DESCRIPTION

A casing rotator according to the present invention will be described in detail below with reference to the accompanying drawings.

The configuration of a casing rotator according to an embodiment of the present invention is shown in FIGS. 1 to 9. In other words, FIG. 1 is a front view showing the configuration of a casing rotator according to an embodiment of the present invention, FIGS. 2 and 4 are views taken along line A-A' or B-B' of FIG. 1, and FIG. 3 is a partial plan view showing a state in that the casing rotator shown in FIG. 2 is coupled to a crane. Furthermore, FIG. 5 is a partial plan view showing the configuration of a lower assembly constituting a part of an embodiment of the present invention, FIGS. 6 and 7 are views taken along line C-C' or D-D' of FIG. 5, and FIG. 8 is a partial plan view showing a state in which a casing is surrounded by the opening/closing means of the lower assembly constituting the part of the embodiment of the present invention.

As shown in these drawings, a casing rotator 10 according to the present invention includes a clamping assembly 100 configured to clamp a casing, and a lower assembly 200 provided under the clamping assembly 100 and configured to selectively fix the casing.

The clamping assembly 100 includes a middle frame 110 provided on a relatively lower side, an upper frame 120 spaced

apart upward from the middle frame 110, clamping cylinders 130 connected to the middle frame 110 and the upper frame 120 at upper and lower ends thereof, and a chuck clamp 140 provided under the middle frame 110 and configured to selectively press
5 and release the inner casing 20 in response to the vertical proximity and separation of the middle frame 110 and the upper frame 120.

The clamping assembly 100 may be formed in a rectangular hexahedral shape, and upper and lower guides 150 may be
10 provided at four corners of the clamping assembly 100.

The lower assembly 200 is spaced apart downward from the clamping assembly 100 by a predetermined distance, and the clamping assembly 100 and the lower assembly 200 may be connected by the upper and lower guides 150. In other words,
15 the lower assembly 200 supports the clamping assembly 100 by the upper and lower guides 150.

The lower assembly 200 is provided with a lower frame 210 having one open side. More specifically, as shown in the drawing, the lower frame 210 having an open right side is
20 provided. As shown in the drawing, the lower frame 210 has a rectangular flat plate shape having a predetermined thickness as a whole and an open right side.

The lower frame 210 has a sideways "U" shape on a plan view when viewed from above.

25 Through the right opening of the lower frame 210, the

casing 20 is allowed to enter and exit to the left or right. In other words, the casing 20 may enter and exit through the opening of the lower frame 210. Accordingly, it is preferable that the opening of the lower frame 210 is formed to have a
5 width larger than the outer diameter of the casing 20.

Moving means 300 are provided at both ends (front and rear ends) of the lower frame 210. The moving means 300 may be composed of wheels such as track shoe assemblies, and are devices that enable the rotator 10 according to the present
10 invention to move on the ground.

Lower clamping means 220 and lower opening/closing means 230 and 240 configured to fix the casing passing through the lower frame 210 vertically are provided on one side of the lower frame 210, and selectively press and fix the casing.

15 It is preferable that the lower clamping means 220 press one side of the casing 20 accommodated in the lower frame 210 and the lower opening/closing means 230 and 240 press the other side of the casing 20 accommodated in the lower frame 210. In other words, as shown in the drawing, the lower
20 clamping means 220 presses the left side of the casing 20 accommodated in the lower frame 210 and the lower opening/closing means 230 and 240 press the right side of the casing 20 accommodated in the lower frame 210.

The casing 20 may be passed through the opening of the
25 lower frame 210. After the casing 20 has been accommodated in

the lower frame 210, the casing 20 is fixed by pressing the outer circumferential surface of the casing 20 from the outside when necessary. The fixing of the casing 20 through pressing is performed by the lower clamping means 220 and the
5 lower opening/closing means 230 and 240.

The lower clamping means 220 includes a first clamping member 222 and a second clamping member 224 installed on the lower frame 210 so that first ends of the first and second clamping members 222 and 224 are rotatable, and a lower
10 clamping cylinder 226 configured to connect the remaining ends of the first and second clamping members 222 and 224.

The first clamping member 222 and the second clamping member 224 are preferably formed to have an arcuate shape, and are preferably installed on the lower frame 210 so that the
15 right ends thereof are rotatable.

In greater detail, as shown in the drawing, a first hinge shaft 250 and a second hinge shaft 252 protruding upward are formed on the top surface of the central portion of the lower frame 210 vertically, and the upper ends of the first hinge
20 shaft 250 and the second hinge shaft 252 are supported by a first fixing end 212 and a second fixing end 214 that are formed on the top side of the lower frame 210 to be spaced apart from each other by a predetermined distance.

The first clamping member 222 and the second clamping
25 member 224 may be further provided with close contact members

S, respectively. In other words, the elastic close contact members S may be attached and fixed to the arcuate surfaces (the right sides in the drawing) of the first clamping member 222 and the second clamping member 224, respectively, in
5 contact with the casing 20. The close contact members S allow the first clamping member 222 and the second clamping member 224 to more effectively come into close contact with and fix the casing 20.

The first fixing end 212 and the second fixing end 214
10 may be each composed of a flat plate having a predetermined thickness, and may be spaced apart upward from the top surface of the lower frame 210 by a predetermined distance.

The lower clamping cylinder 226 is installed at the left ends of the first and second clamping members 222 and 224. In
15 other words, as shown in the drawing, the front and rear ends of the lower clamping cylinder 226 are rotatably connected to the left ends of the first and second clamping members 222 and 224, respectively. Accordingly, the left ends of the first and second clamping members 222 and 224 are selectively moved
20 close to each other and away from each other in response to the retraction and extension of the lower clamping cylinder 226.

The lower opening/closing means 230 and 240 include a first opening/closing means 230 and a second opening/closing
25 means 240 that are symmetrically installed in a pair on the

lower frame 210 and selectively block at least a part of the open side of the lower frame 210.

The first opening/closing means 230 and the second opening/closing means 240 are formed to be symmetrical to each other, and press the rear and front halves of the right side of the casing 20, respectively, accommodated in the lower frame 210.

The first opening/closing means 230 includes a first opening/closing member 232 having an arcuate shape, and a first opening/closing cylinder 234 configured to allow the first opening/closing member 232 to move.

At least the surface of the first opening/closing member 232 in contact with the casing 20 is preferably formed to have an arcuate shape, as shown in the drawing. The reason for this is to form a shape corresponding to the outer surface of the casing 20 formed in a cylindrical shape and allow the first opening/closing member 232 to effectively come into close contact with the outer surface of the casing 20.

As shown in the drawing, the left end of the first opening/closing member 232 is rotatably connected to the first hinge shaft 250, and the right end thereof is rotatably connected to the first opening/closing cylinder 234.

As shown in the drawing, the left end of the first opening/closing cylinder 234 is rotatably connected to the lower frame 210, and the right end thereof is rotatably

connected to the first opening/closing member 232. More specifically, a first fixing shaft 254 is vertically installed between the first fixing end 212 and the lower frame 210, and the left end of the first opening/closing cylinder 234 is
5 rotatably connected to the first fixing shaft 254.

The first opening/closing member 232 and the right end of the first opening/closing cylinder 234 are rotatably connected to each other by a first link shaft 236.

The first fixing shaft 254 is preferably formed to be
10 spaced apart from the first hinge shaft 250 by a predetermined distance. More specifically, the first fixing shaft 254 is installed at a longer distance from the center of the lower frame 210 than the first hinge shaft 250.

Therefore, when the first opening/closing cylinder 234 is
15 extended, the first opening/closing member 232 is rotated clockwise around the first hinge shaft 250 and comes into close contact with the outer surface of the casing 20 (see FIG. 8). In contrast, when the first opening/closing cylinder 234 is retracted, the first opening/closing member 232 is
20 rotated counterclockwise around the first hinge shaft 250 and moves away from the outer surface of the casing 20 (see FIG. 5).

The first opening/closing member 232 may be further provided with the close contact member S. In other words, a
25 close contact member S made of the same elastic material as

the clamping members 222 and 224 is further provided on a portion of the first opening/closing member 232 in contact with the casing 20, and enhances adhesion to the casing 20.

The second opening/closing means 240 is installed
5 opposite to the first opening/closing means 230 in a symmetrical structure. In other words, as shown in the drawing, it is provided on the front end of the lower frame 210.

The second opening/closing means 240 includes a second
10 opening/closing member 242 having an arcuate shape, and a second opening/closing cylinder 244 configured to allow the second opening/closing member 242 to move. Furthermore, a configuration in which the second opening/closing member 242 and the left end of the second opening/closing cylinder 244
15 are rotatably connected to the second hinge shaft 252 and the second fixing shaft 256 and a configuration in which the second opening/closing member 242 and the right end of the second opening/closing cylinder 244 are rotatably connected by a second link shaft 246 are the same as the above-described
20 configurations of the first opening/closing means 230.

Therefore, when the second opening/closing cylinder 244 is extended, the second opening/closing member 242 is rotated counterclockwise around the second hinge shaft 252 and comes into close contact with the right side of the outer surface of
25 the casing 20 (see FIG. 8). In contrast, when the second

opening/closing cylinder 244 is retracted, the second opening/closing member 242 is rotated clockwise around the second hinge shaft 252 and moves away from the right side of the outer surface of the casing 20 (see FIG. 5).

5 The second opening/closing member 242 may be further provided with a close contact member S, as in the first opening/closing member 232. In other words, the close contact member S made of an elastic material may be further provided on the portion of the second opening/closing member 242 in
10 contact with the casing 20, and may enhance adhesion to the casing 20.

A bridge 310 connected to a crane C is rotatably installed on the open side of the lower frame 210. The bridge 310 may be connected to a crane wheel C' provided in the lower
15 portion of the crane C, and may serve to prevent oscillation or rotation during the operation of the casing rotator 10.

An avoidance space 320 is formed in the bridge 310 to prevent interference with the casing when the rotator 10 moves horizontally. In other words, the avoidance space 320 of a
20 predetermined size is vertically formed through the inside of the bridge 310. When the rotator 10 is moved with the bridge 310 lifted, the upper protrusion of the casing 20 embedded in the ground may pass through the avoidance space 320.

The bridge 310 includes a pair of connection rods 312
25 configured to extend from the open end of the lower frame 210,

and a connection end 314 configured to connect the ends of the connection rods 312 to each other.

The connection rods 312 are formed in a rod shape having a predetermined length, and are rotatably connected to the
5 right end of the lower frame 210 by connection shafts 316, as shown in the drawing.

The connection rods 312 are connected in a pair to the front and rear ends of the right side of the lower frame 210, and the connection end 314 is formed at the right ends of the
10 pair of connection rods 312 in an integrated manner. Accordingly, the right ends of the pair of connection rods 312 are connected by the connection end 314.

In this way, when the pair of connection rods 312 and the connection end 314 are connected to each other, the bridge 310
15 forms a sideways "U"-shaped flat cross-section, and the avoidance space 320 of a predetermined size is formed inside the bridge 310.

A connection recess 318 is formed on the right side of the connection end 314. The connection recess 318 is a recess
20 indented from the right end of the connection end 314 to the left. The crane wheel C' of the crane C may be accommodated in the connection recess 318.

It is preferable that the right end of the connection end 314 have a sideways "U" shape, as shown in the drawing. The
25 central recess of this sideways "U" shape becomes the

connection recess 318.

A reinforcing member 330 may be installed between the pair of connection rods 312 across the avoidance space 320.

The reinforcing member 330 may be installed in a front-rear direction from the left ends of the pair of connection rods 312, and may serve to reinforce the strength of the lower frame 210 having an open right end.

It is preferable that the reinforcing member 330 is installed to be detachably attached to the connection rods 312. In other words, when the rotator 10 is moved, the reinforcing member 330 may be separated or may be at least moved out of the avoidance space 320 so as not to interfere with the upper end of the casing 20.

The reinforcing member 330 may be installed to be coupled to or separated from the connection rods 312 by bolts or the like.

Furthermore, the reinforcing member 330 may be installed so as to be rotatable around one end thereof. In other words, the front end of the reinforcing member 330 may be rotatably installed at the left end of the front connection rod 312, and the rear end thereof may be detachably fixed to the left end of the other (rear) connection rod 312. In this case, when necessary, the reinforcing member 330 may be rotated clockwise around the front end thereof and leave the avoidance space 320.

Meanwhile, the bridge 310 may be rotated counterclockwise around the left end thereof when necessary. In other words, when the casing rotator 10 is horizontally moved on land, it is necessary to lift the bridge 310 so that the bridge 310
5 does not interfere with the upper end of the casing 20 buried in the ground. In this case, the bridge 310 may be lifted using electric power.

To this end, a rope winch 340 is provided at the right end of the middle frame 110, and a rope end 344 to which the
10 rope 342 is connected is formed to protrude upward on the top surface of the right end of the bridge 310. Accordingly, when the rope 342 is wound by applying power to the rope winch 340, the bridge 310, which was maintained horizontally as shown in FIG. 1, is rotated counterclockwise around the left end
15 thereof, and the right end thereof is lifted.

Meanwhile, although not shown in detail, a locking device may be additionally configured such that the bridge 310 does not fall by itself after the bridge 310 has been lifted using the rope winch 340. In other words, there may be additionally
20 provided a configuration in which the bridge 310 is fixed in a lifted state using a safety pin or the like. In this way, when the bridge 310 is lifted by the rope winch 340 and then fixed with the locking device, the bridge 310 is prevented from falling and rotating unintentionally, thereby ensuring
25 work stability and also reducing the risk of safety-related

accidents.

A power pack 350 may be further provided on the left side of the lower frame 210.

A state in which the casing rotator having the above-
5 described configuration is used for a soil excavation operation will be described with reference to FIGS. 9 to 15.

FIG. 9 is an operational flowchart showing the process of inserting a casing through the casing rotator according to the present invention.

10 As shown in the drawing, first, there is performed the excavation preparation work of setting equipment and then inserting the casing into the ground, as shown in FIG. 9(a). In this case, the casing 20 is lifted with a crane (C) and then the casing 20 is lowered from a location above the casing
15 rotator 10 to the lower side of the casing rotator 10. Then, soil excavation work is performed, as shown in FIG. 9(b), in which case excavation equipment such as a hammer grab may also be used. In addition, when the extension of the casing is required as excavation proceeds, additional work such as the
20 assembly of joint bolts is performed, as shown in FIG. 9(c).

In this case, although an operator may perform work on the upper part of the casing rotator 10, work such as joint bolt work may also be performed on the ground. In other words, in the case of the casing rotator 10 according to the
25 present invention, one side of the lower frame 210 is open,

and thus the operator may approach the casing 20 and perform work through the opening.

In this way, a state in which the operator performs work on the ground through the opening of the lower frame 210 is shown in the partial side view and plan view in FIGS. 10 and 11.

Next, FIG. 12 shows the process of moving the casing rotator 10 after reaching the depth of soil excavation through the above-described process. In this case, a part of the upper part of the casing 20 is exposed out of the ground. Accordingly, when the casing rotator 10 attempts to move horizontally, interference occurs between the bridge 310 connected to the lower frame 210 and the reinforcing member 330.

Therefore, first, the reinforcing member 330 is removed, and then the end of the bridge 310 (the left end in FIG. 12) is lifted by operating the rope winch 340. In this case, the state shown in FIG. 12 is obtained. In this case, when the casing rotator 10 is moved horizontally (to the right in FIG. 12), interference between the bridge 310 and the casing 20 is prevented. In other words, the upper end of the casing 20 passes through the avoidance space 320 of the bridge 310 so that interference does not occur.

As described above, in the casing rotator 10 according to the present invention, one side of the lower frame 210 is

open. When the casing rotator 10 is moved after the depth of the soil excavation has been reached, the casing rotator 10 is moved out of the casing 20 only by the forward, backward, leftward and rightward movement of the casing rotator 10 itself without the need to lift the casing rotator 10 above the casing 20 by using the crane.

FIG. 13 shows the process of pulling out the casing 20 after rock excavation work. As described in FIG. 12, when the casing rotator 10 is moved out of the casing 20, RCD rock excavation work is performed, as shown in FIG. 13(a). Thereafter, as shown in FIG. 13(b), the casing rotator 10 approaches the casing 20 again to perform the work of drawing out the casing 20 inserted into the ground.

In this case, in the casing rotator 10 according to the present invention, one side of the lower frame 210 is open, so that the upper end of the casing 20 is located at the center of the lower frame 210 by moving by itself without the need for a crane (C). Thereafter, drawing work is performed.

In addition, as shown in FIGS. 13(c) and 13(d), work such as the insertion of reinforcing meshes and the pouring of concrete is performed to complete the construction.

FIG. 14 shows the moving states of the casing rotator 10 according to the present invention in the above-described operation process in detail. In other words, there is shown an operational flowchart showing a process in which the casing

rotator according to the present invention approaches or moves away from a casing inserted into the ground.

As shown in the drawing, the casing rotator 10 according to the present invention may be brought close to the casing 20 in a state in which the casing 20 is inserted into the ground and the upper end of the casing 20 is partially exposed out of the ground. In this case, as shown in FIG. 14(a), when the open portion of the lower frame 210 is brought close to the casing 20 with the end of the bridge 310 lifted, the casing 20 is located in the center of the lower frame 210.

Then, the work of drawing out the casing 20 or other work may be performed. The casing rotator 10 may be rotated 360 degrees in a state in which the casing 20 is located in the center of the casing rotator 10, as shown in FIG. 14(b). The casing rotator 10 may be moved in either direction of the front, rear, left or right according to a user's selection. In other words, the casing rotator 10 according to the present invention may move away from the casing 20 by itself in a state in which the casing 20 is inserted into the ground and the upper end of the casing 20 is partially exposed out of the ground.

As shown in FIG. 14(c), the casing rotator 10 may be moved horizontally by allowing the casing 20 to pass through the open portion of the lower frame 210 with the end of the bridge 310 lifted, so that the casing rotator 10 may be moved

in any direction.

FIG. 15 is a partial plan view showing a process in which the casing 20 is fixed by the lower assembly 200 that constitutes a part of the embodiment of the present invention.

5 First, the casing rotator 10 is brought close to the casing 20, as shown in FIG. 15(a). In this case, the casing 20 is fixed into the ground, and thus the casing rotator 10 is moved to the right so that the casing 20 is accommodated in the lower frame 210 through the opening of the lower frame
10 210.

In this way, a state in which the casing rotator 10 is horizontally moved and the casing 20 is located in the center of the lower frame 210 is shown in FIG. 14(b).

Then, in order to fix the casing 20, the right side of
15 the casing 20 is pressed using the lower opening/closing means 230 and 240, as shown in FIG. 14(c). In this case, when the opening/closing cylinders 234 and 244 are extended, the opening/closing cylinders 234 and 244 are extended in the direction of the arrow so that the opening and closing members
20 232/242 press the right side of the casing 20. In other words, the first opening/closing member 232 is rotated in a clockwise direction, and the second opening/closing member 242 is rotated in a counterclockwise direction. Accordingly, the first opening/closing member 232 and the second
25 opening/closing member 242 come into close contact with the

right side of the casing 20.

When the opening/closing members 232 and 242 come into close contact with the right side of the casing 20 as described above, the casing 20 is then pressed by the lower clamping means 220. In other words, when the lower clamping cylinder 226 is contracted, the left ends of the first clamping member 222 and the second clamping member 224 are brought close to each other, as indicated by the arrows, and thus the first clamping member 222 and the second clamping member 224 come into close contact with the left side of the casing 20.

When the lower clamping means 220 and the lower opening/closing means 230 and 240 cover and press the left and right sides of the casing 20 as described above, the casing 20 is fixed to the lower frame 210.

Next, the release of the casing 20 and the separation of the casing rotator 10 may be performed in reverse order to that described above.

The scope of the present invention is not limited to the embodiments illustrated above, and many other modifications based on the present invention may be made by those skilled in the art within the above-described technical scope.

For example, although a case where the rope 342 and the rope winch 340 are used to move the bridge 310 has been illustrated in the above embodiment, the bridge 310 may be

lifted using various other power means or manually. In addition, although a case in which only one rope 342 and one rope winch 340 are provided is illustrated in the present invention, a case in which two or more ropes and two or more
5 rope winches are provided may be possible.

In addition, although a case where the lower opening/closing means 230 and 240 are configured in a pair as the first and second opening/closing means 230 and 240 have been illustrated in the above embodiment as an example, one
10 opening/closing means or three or more opening/closing means may be provided.

Moreover, although a case where the lower opening/closing means 230 and 240 covers only a part of the right side of the casing 20 is illustrated in the above embodiment, it may be
15 configured to cover the overall right side of the casing 20.

The casing rotator according to the present invention has the following advantages:

First, in the present invention, one side of the lower frame of the casing rotator is open. Accordingly, since
20 interference between the upper end of the casing inserted into the ground and the lower frame is prevented, the casing rotator may move on the ground by itself and move out of the casing, and thus work efficiency is dramatically improved. In other words, in the related art, a lower frame has a structure
25 in which all four sides are closed, and thus the casing

rotator needs to be lifted with a crane and moved to another area, with the result that the work is cumbersome and time consuming. The present invention has an advantage in that such inconvenience is eliminated.

5 Second, in the present invention, the bridge connected to the crane is installed to be rotatable (openable) in the casing rotator, and also the avoidance space is formed inside. Accordingly, an advantage arises in that in the case where the bridge is opened by lifting the end of the bridge when the
10 casing rotator moves horizontally, interference with the casing is prevented by the avoidance space.

 Third, in the present invention, the reinforcing member is further provided on the bridge. Accordingly, an advantage arises in that even in a structure in which one side of the
15 lower frame is open, the force pressing the casing through the lower frame is reinforced.

 Fourth, in the present invention, the lower opening/closing means configured to press the casing is rotatably installed on the lower frame. Accordingly, an
20 advantage arises in that even when the casing is accommodated in or moved out of the central portion of the lower frame, the lower opening/closing means and the casing are prevented from interfering with each other.

 Fifth, in the present invention, an advantage arises in
25 that one side of the lower frame is open, and thus work

efficiency is improved during excavation work. In other words, in the related art, work cannot be performed on the ground, and thus there was inconvenience such as working in an unstable posture. However, in the present invention, an operator may perform the work of assembling joint bolts in the work of extending a casing on the ground through the open portion of the lower frame. Accordingly, an advantage arises in that work is easy and convenient.

Sixth, in the present invention, an advantage also arises in that the risk of safety-related accidents is prevented. In other words, in the present invention, the rotator may be moved only with the driving ability of the rotator, and thus the problem of lifting the rotator high from the ground using a crane is prevented. The waste of energy required to lift such heavy equipment and the risk of safety-related accidents attributable to the lifting are also prevented.

Although the specific embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

CLAIMS

1. A casing rotator comprising:

a clamping assembly configured to clamp a casing; and

5 a lower assembly provided under the clamping assembly, and configured to selectively fix the casing;

wherein the lower assembly is provided with a lower frame having one open side;

wherein a lower clamping means and lower opening/closing
10 means configured to fix the casing passing through the lower frame vertically are provided on one side of the lower frame, and selectively press and fix the casing;

wherein the lower clamping means comprises first and second clamping members configured such that first ends thereof are
15 rotatably installed on the lower frame, and a lower clamping cylinder configured to connect remaining ends of the first and second clamping members to each other; and

wherein the lower opening/closing means comprise first and second opening/closing means symmetrically installed on the
20 lower frame in a pair, and configured to selectively open and close at least parts of the one open side of the lower frame.

2. The casing rotator of claim 1, wherein:

a bridge configured to be connected to a crane is rotatably
25 installed on the one open side of the lower frame; and

an avoidance space configured to prevent interference with the casing when the rotator moves horizontally is formed in the bridge.

5 3. The casing rotator of claim 2, wherein:

the bridge comprises a pair of connection rods formed to extend from the one open side of the lower frame, and a connection end configured to connect outer ends of the pair of connection rods to each other; and

10 a reinforcing member is installed between the pair of connection rods across the avoidance space.