

INTELLIGENT SLEEVE GROUTING APPARATUS FOR PREFABRICATED STRUCTURE, AND CONSTRUCTION METHOD

TECHNICAL FIELD

5 The present invention relates to the field of prefabrication-based construction, in particular to an intelligent sleeve grouting apparatus for prefabricated structure and a construction method.

BACKGROUND

10 With the continuous advancement of national policies, prefabrication-based construction has become a development trend of the construction industry. In prefabrication-based construction, the effective connection between prefabricated components is the key to ensuring safety and quality of prefabricated structures.

15 Existing connection methods include sleeve grouting connection, grout anchor lap connection, sleeve extrusion connection, etc. Although sleeve grouting connection is more commonly used, due to the complex construction operation of sleeve grouting, the uneven skills of construction personnel and the difficulty of visual inspection of the construction quality, occasions where grouting is not full often happen, and on-site inspection is very difficult. If the sleeve clogs up during the grouting process, the grouting pressure is likely to be high or the slurry overflows, which makes a false idea that the sleeve has been filled and affects the actual grouting quality of the sleeve.

SUMMARY

20 An objective of the present invention is to provide an intelligent sleeve grouting apparatus for a prefabricated structure and construction method, to overcome the deficiencies of the prior art, through real-time monitoring of data such as grouting pressure, flow rate and flow volume, so as to intelligently determine the grouting state and take corresponding grouting adjustments measures to ensure the quality of grouting.

The technical scheme of an intelligent sleeve grouting apparatus for a prefabricated structure of the present invention is as follows:

An intelligent sleeve grouting apparatus for a prefabricated structure comprises a hopper,

a material bin, a screw pump, a grouting pipe, a pressure sensor and a flow meter. The material bin is connected to an outlet of the hopper. The screw pump is arranged inside the material bin, and a grout outlet of the screw pump extends out of the material bin. The grouting pipe is connected to the grout outlet of the screw pump. The pressure sensor is arranged at a grout outlet of the grouting pipe. The flow meter is arranged between the screw pump and the grouting pipe.

When the intelligent sleeve grouting apparatus for the prefabricated structure of the present invention is in use, grout is injected into the material bin from the outlet of the hopper, then discharged from the grouting pipe through the screw pump, and finally injected into a sleeve of the prefabricated structure. During the grouting process, the flow meter and pressure sensor can detect the flow and pressure of the grout in real time. Once it is detected that the flow and pressure of the grouting are abnormal, corresponding measures can be taken automatically, such as unclogging the pipe to avoid an insufficient grouting in the sleeve.

Further, the intelligent sleeve grouting apparatus for the prefabricated structure also includes a control system, which is connected in signal to each of the screw pump, the pressure sensor and the flow meter. The control system can receive data from the pressure sensor and the flow meter, and control the speed and direction of the screw pump. When the control system finds that the grouting is abnormal, it can automatically take corresponding measures to control the screw pump to change the flow rate and direction of the grout.

Further, the intelligent sleeve grouting apparatus for the prefabricated structure also includes a mobile terminal device, which is connected to the control system by means of wireless transmission. In the process of on-site grouting of a steel sleeve, hardware equipment and algorithms in the device are used to obtain parameters related to the quality of the grouting process and construction results, such as: grouting flow, grouting volume, grouting pressure, which are calculated and automatically recorded. At the same time, it is connected to the user's mobile terminal device through wireless transmission, so as to realize real-time reading of data. During operation, the user can immediately determine the actual grouting situation on site by reading the real-time data. Quality problems that may occur during the grouting process can be avoided. Besides, through these data, the internal material feeding situation of the sleeve that is invisible to the naked eye can be known.

Further, in the intelligent sleeve grouting apparatus for the prefabricated structure, the

screw pump includes an outer cylinder, a screw, a collector and a base. The screw includes a shaft, a first helical section arranged on a surface of a lower section of the shaft, and a second helical section arranged on a surface of an upper section of the shaft. The helix of the first helical section is smaller than that of the second helical section. The first helical section is arranged inside the outer cylinder, and the second helical section is arranged outside the outer cylinder. An upper end of the screw is movably connected to the base. The collector is sleeved at an end of the second helical section of the screw and is fixedly connected to a grout inlet of the outer cylinder. The size of the inlet of the collector matches the size of the second helical section. When the screw pump pumps the grout, the grout first enters the collector through the second helical section. Since the diameter of the outer cylinder is smaller than the diameter of the collector, when the grout enters the outer cylinder from the collector, the grout is compressed, thereby increasing the grouting pressure.

Further, the intelligent sleeve grouting apparatus for the prefabricated structure also includes a mobile trolley to facilitate movement, and the material bin is arranged on the mobile trolley.

Further, the intelligent sleeve grouting apparatus for the prefabricated structure also includes a remote communication module and a client device to facilitate monitoring. The screw pump, pressure sensor and flow meter are each connected in signal to the client device through the remote communication module. The client device can be a mobile phone on which APPs are installed.

Further, the intelligent sleeve grouting apparatus for prefabricated structure also includes a circulation pipe and a three-way valve. An inlet of the circulation pipe is arranged between the pressure sensor and the grout outlet of the grouting pipe. An outlet of the circulation pipe is connected to a first port of the three-way valve. A third valve, a one-way valve and a pumping device are provided on the circulation pipeline. A second port of the three-way valve is connected to a second valve. A first valve is provided upstream to the pressure sensor. The control system is connected in signal to each of the first valve, the second valve, the third valve and the pumping device.

During operation, the grout outlet of the grouting pipe is engaged with a grout feeding port of the sleeve, and the third port of the three-way valve is engaged with a grout discharge port of the sleeve. Open the first valve and the second valve, and close the third valve and the

pumping device. When the sleeve is clogged up, the first valve and the second valve are closed, and the third valve and the pumping device are opened to form a closed circulation system between the circulation pipeline and the sleeve. Since the sleeve is in a clogged state, the pumping device will cause a decrease in the pressure on the grout inlet side of the pumping device and an increase in the pressure on the grout outlet side of the pumping device, thereby forming a pressure difference in the circulation system, so as to unclog the sleeve. When the sleeve is unclogged, the first valve and the second valve are re-opened, and the third valve and the pumping device are closed, and the grouting of the sleeve can be continued.

The present invention also provides a construction method for the above-mentioned intelligent sleeve grouting apparatus for the prefabricated structure, which comprises the following steps:

S1, inject grout into the material bin through the hopper, activate the screw pump in a forward direction, feed the sleeve of the prefabricated structure with grout, and detect flow and pressure of the grout in a real-time manner using the pressure sensor and the flow meter during grouting;

S2, set a pressure P1 for determining a clogging state; when the pressure of the grout exceeds the pressure P1 for determining the clogging state and the flow rate of the grout becomes small, repeatedly activate the screw pump in forward and reverse directions several times, and then continue to activate the screw pump in the forward direction for grouting the sleeve;

S3, when a cumulative grouting amount detected by the flow meter reaches a required grouting amount for the sleeve, finish the grouting of the sleeve of the prefabricated structure.

The construction method for the intelligent sleeve grouting apparatus for the prefabricated structure of the present invention intelligently determines the grouting state through the data obtained by monitoring equipment such as the pressure sensor and flow meter. If the sleeve is clogged up, the screw pump is automatically controlled to be repeatedly activated in the forward and reverse directions to unclog the sleeve. When the cumulative grouting amount detected by the flow meter reaches a required grouting amount for the sleeve, it indicates that the grouting is completed.

The construction method for the intelligent sleeve grouting apparatus for the prefabricated structure of the present invention is simple to operate, and no longer requires the construction personnel to determine the grouting quality by themselves. The cumbersome process of traditional grouting construction is also avoided.

5 Further, in the construction method for the intelligent sleeve grouting apparatus for the prefabricated structure, a limit pressure P2 can be set in S2, and when the pressure of the grout exceeds the limit pressure P2, the screw pump is deactivated.

10 Further, in the construction method for the intelligent sleeve grouting apparatus for the prefabricated structure, a mobile terminal device can be involved. The mobile terminal device is connected to the control system by means of wireless transmission. Data from the pressure sensor and flow meter are calculated and recorded through the mobile terminal device. User can set the screw pump, the pressure P1 for determining a clogging state, and the limit pressure P2 through the mobile terminal device. User can also query historical data through the mobile terminal device. The mobile terminal device opens the parameter setting function
15 for the user. User can set the basic parameters of the hardware through parameter settings. On the basis of the above, in order to further increase the frequency of parameter use and facilitate the user to summarize and analyze the process parameters, the mobile terminal device is also provided with a data query function. User can query historical data via a data query interface. User can obtain a data curve corresponding to the grouting process through
20 this interface. A data change trend can be derived from changes of the data, so that further analysis is possible.

The present invention also provides another construction method for the above-mentioned intelligent sleeve grouting apparatus for the prefabricated structure, which comprises the following steps:

25 S1, engage the grout outlet of the grouting pipe with a grout feeding port of a sleeve, and engage the third port of the three-way valve with a grout discharge port of the sleeve. Open the first valve and the second valve, and close the third valve and the pump device.

S2, inject grout into the material bin through the hopper, and activate the screw pump in a forward direction. Feed the sleeve of the prefabricated structure with grout. Detect flow and
30 pressure of the grout in a real-time manner using the pressure sensor and the flow meter

during grouting.

S3, When the sleeve is clogged up, close the first valve and the second valve, and open the third valve and the pumping device.

5 S4, When the sleeve is un clogged, re-open the first valve and the second valve, and close the third valve and the pumping device.

S5, When a cumulative grouting amount detected by the flow meter reaches a required grouting amount for the sleeve, finish the grouting of the sleeve of the prefabricated structure.

10 According to the construction method for the intelligent sleeve grouting apparatus for the prefabricated structure of the present invention, when the sleeve is clogged up, the first valve and the second valve are closed, and the third valve and the pumping device are opened, so as to form a closed circulation system between the circulation pipeline and the sleeve. Since the sleeve is in a clogged state, the pumping device will cause a decrease in the pressure on the grout inlet side of the pumping device and an increase in the pressure on the grout outlet side of the pumping device, thereby forming a pressure difference in the circulation system, so as to unclog the sleeve. When the sleeve is unclogged, the first valve and the second valve are re-opened, and the third valve and the pumping device are closed, and the grouting of the sleeve can be continued.

20 In addition, when a closed circulation system is formed between the circulation pipeline and the sleeve, the reading of the pressure sensor will change upon clogging or unclogging of the sleeve. Therefore, the first valve, the second valve, the third valve and the pumping device can be automatically controlled through the control system by referring to the reading of the pressure sensor, so as to realize automatic grouting.

BRIEF DESCRIPTION OF THE DRAWINGS

25 Fig. 1 is a front view of an intelligent sleeve grouting apparatus for prefabricated structure according to the present invention;

Fig. 2 is a top view of an intelligent sleeve grouting apparatus for prefabricated structure according to the present invention;

Fig. 3 is a schematic diagram of a screw pump of an intelligent sleeve grouting apparatus

for prefabricated structure according to the present invention;

Fig. 4 is a diagram showing working principle of an intelligent sleeve grouting apparatus for prefabricated structure according to the present invention.

DETAILED DESCRIPTION

5 The present invention will be further described in detail below with reference to the accompanying drawings and specific embodiments. The advantages and features of the present invention will become apparent from the following description and claims. It should be noted that, the accompanying drawings are all in a very simplified form and in inaccurate scales, and are only used for the purpose of explaining the embodiments of the present
10 invention in an easy and clear manner.

Embodiment 1:

Referring to Fig. 1 to Fig. 3, the technical solution of an intelligent sleeve grouting apparatus for prefabricated structure of the present embodiment is as follows.

15 An intelligent sleeve grouting apparatus for prefabricated structure includes a hopper 1, a material bin 2, a screw pump 3, a grouting pipe 4, a pressure sensor 5, and a flow meter 6; the material bin 2 is connected to an outlet of the hopper 1; The screw pump 3 is arranged inside the material bin 2, and the grout outlet of the screw pump 3 extends out of the material bin 2; the grouting pipe 4 is connected to the grout outlet of the screw pump 3; the pressure sensor 5 is arranged on the grouting pipe 4; the flow meter 6 is arranged between the screw pump 3
20 and the grouting pipe 4.

When the intelligent sleeve grouting apparatus for the prefabricated structure of the present invention is in use, grout is injected into the material bin 2 from the outlet of the hopper 1, then discharged from the grouting pipe 4 through the screw pump 3, and finally injected into a sleeve a of the prefabricated structure. During the grouting process, the flow
25 meter 6 and pressure sensor 5 can detect the flow and pressure of the grout in real time. Once it is detected that the flow and pressure of the grouting are abnormal, corresponding measures can be taken automatically, such as unclogging the pipe to avoid an insufficient grouting in the sleeve a.

As a preferred embodiment, the intelligent sleeve grouting apparatus for the prefabricated structure further includes a control system, which is connected in signal to each of the screw pump 3, the pressure sensor 5 and the flow meter 6. The control system can receive data from the pressure sensor 5 and the flow meter 6, and control the speed and direction of the screw pump 3. When the control system finds that the grouting is abnormal, it can automatically take corresponding measures to control the screw pump 3 to change the flow rate and direction of the grout.

In a preferred embodiment, the intelligent sleeve grouting apparatus for the prefabricated structure further includes a mobile terminal device, which is connected to the control system by means of wireless transmission. In the process of on-site grouting of a steel sleeve, hardware equipment and algorithms in the device are used to obtain parameters related to the quality of the grouting process and construction results, such as: grouting flow, grouting volume, grouting pressure, which are calculated and automatically recorded. At the same time, it is connected to the user's mobile terminal device through wireless transmission, so as to realize real-time reading of data. During operation, the user can immediately determine the actual grouting situation on site by reading the real-time data. Quality problems that may occur during the grouting process can be avoided. Besides, through these data, the internal material feeding situation of the sleeve that is invisible to the naked eye can be known.

As a preferred embodiment, in the intelligent sleeve grouting apparatus for the prefabricated structure, the screw pump 3 includes an outer cylinder 31, a screw 32, a collector 33 and a base 34. The screw 32 includes a shaft 321, a first helical section 322 arranged on a surface of a lower section of the shaft 321, and a second helical section 323 arranged on a surface of an upper section of the shaft 321. The helix of the first helical section 322 is smaller than that of the second helical section 323. The first helical section 322 is arranged inside the outer cylinder 31, and the second helical section 323 is arranged outside the outer cylinder 31. An upper end of the screw 32 is movably connected to the base 34. The collector 33 is sleeved at an end of the second helical section 323 of the screw 32 and is fixedly connected to a grout inlet of the outer cylinder 31. The size of the inlet of the collector 33 matches the size of the second helical section 323. When the screw pump 3 pumps the grout, the grout first enters the collector 33 through the second helical section 323. Since the diameter of the outer cylinder 31 is smaller than the diameter of the collector 33, when the grout enters the outer cylinder 31 from the collector 33, the grout is compressed, thereby

increasing the grouting pressure.

As a preferred embodiment, the intelligent sleeve grouting apparatus for the prefabricated structure further includes a mobile trolley 7 to facilitate movement, and the material bin 2 is arranged on the mobile trolley 7.

5 As a preferred embodiment, the intelligent sleeve grouting apparatus for the prefabricated structure further includes a remote communication module and a client device to facilitate monitoring. The screw pump 3, pressure sensor 5 and flow meter 6 are each connected in signal to the client device through the remote communication module. The client device may be a mobile phone on which APPs are installed.

10 As a preferred embodiment, the intelligent sleeve grouting apparatus for prefabricated structure further includes a circulation pipe 13 and a three-way valve 14. An inlet of the circulation pipe 13 is arranged between the pressure sensor 5 and the grout outlet of the grouting pipe 4. An outlet of the circulation pipe 13 is connected to a first port of the three-way valve 14. A third valve 10, a one-way valve 11 and a pumping device 12 are provided on
15 the circulation pipeline 13. A second port of the three-way valve 14 is connected to a second valve 9. A first valve 8 is provided upstream to the pressure sensor 5. The control system is connected in signal to each of the first valve 8, the second valve 9, the third valve 10 and the pumping device 12.

During operation, the grout outlet of the grouting pipe 4 is aligned and connected with a
20 grout feeding port of the sleeve a, and the third port of the three-way valve 14 is aligned and connected with a grout discharge port of the sleeve a. Open the first valve 8 and the second valve 9, and close the third valve 10 and the pumping device 12. When the sleeve a is clogged up, the first valve 8 and the second valve 9 are closed, and the third valve 10 and the pumping device 12 are opened to form a closed circulation system between the circulation pipeline 13
25 and the sleeve a. Since the sleeve a is in a clogged state, the pumping device 12 will cause a decrease in the pressure on the grout inlet side of the pumping device 12 and an increase in the pressure on the grout outlet side of the pumping device 12, thereby forming a pressure difference in the circulation system, so as to unclog the sleeve a. When the sleeve a is unclogged, the first valve 8 and the second valve 9 are re-opened, and the third valve 10 and
30 the pumping device 12 are closed, and the grouting of the sleeve a can be continued.

Embodiment 2:

This embodiment provides a construction method for the intelligent sleeve grouting apparatus for prefabricated structure described in Embodiment 1. The method includes the following steps:

5 S1, Inject grout into the material bin 2 through the hopper 1, activate the screw pump 3 in a forward direction, feed the sleeve a of the prefabricated structure with grout, and detect flow and pressure of the grout in a real-time manner using the pressure sensor 5 and the flow meter 6 during grouting.

10 S2, Set a pressure P1 for determining a clogging state; when the pressure of the grout exceeds the pressure P1 for determining the clogging state and the flow rate of the grout becomes small, repeatedly activate the screw pump 3 in forward and reverse directions several times, and then continue to activate the screw pump 3 in the forward direction for grouting the sleeve a.

15 S3, When a cumulative grouting amount detected by the flow meter 6 reaches a required grouting amount for the sleeve a, finish the grouting of the sleeve a of the prefabricated structure.

20 The construction method for the intelligent sleeve grouting apparatus for the prefabricated structure of this embodiment intelligently determines the grouting state through the data obtained by monitoring equipment such as the pressure sensor 5 and flow meter 6. If the sleeve is clogged up, the screw pump 3 is automatically controlled to be repeatedly activated in the forward and reverse directions to unclog the sleeve. When the cumulative grouting amount detected by the flow meter 6 reaches a required grouting amount for the sleeve a, it indicates that the grouting is completed.

25 The construction method for the intelligent sleeve grouting apparatus for the prefabricated structure of the present invention is simple to operate, and no longer requires the construction personnel to determine the grouting quality by themselves. The cumbersome process of traditional grouting construction is also avoided.

As a preferred embodiment, in the construction method for the intelligent sleeve grouting apparatus for the prefabricated structure, a limit pressure P2 can be set in S2, and when the

pressure of the grout exceeds the limit pressure P2, the screw pump 3 is deactivated.

As a preferred embodiment, in the construction method for the intelligent sleeve grouting apparatus for the prefabricated structure, a mobile terminal device is further involved. The mobile terminal device is connected to the control system by means of wireless transmission.

5 Data from the pressure sensor 5 and flow meter 6 are calculated and recorded through the mobile terminal device. User can set the screw pump 3, the pressure P1 for determining a clogging state, and the limit pressure P2 through the mobile terminal device. User can also query historical data through the mobile terminal device. The mobile terminal device opens the parameter setting function for the user. User can set the basic parameters of the hardware
10 through parameter settings. On the basis of the above, in order to further increase the frequency of parameter use and facilitate the user to summarize and analyze the process parameters, the mobile terminal device is also provided with a data query function. User can query historical data via a data query interface. User can obtain a data curve corresponding to the grouting process through this interface. A data change trend can be derived from changes
15 of the data, so that further analysis is possible.

Embodiment 3:

Referring to Fig. 1, Fig. 2, Fig. 4, the present embodiment provides another construction method for the intelligent sleeve grouting apparatus for prefabricated structure. The method includes the following steps:

20 S1, Align and connect the grout outlet of the grouting pipe 4 with a grout feeding port of the sleeve a, and align and connect the third port of the three-way valve 14 with a grout discharge port of the sleeve a. Open the first valve 8 and the second valve 9, and close the third valve 10 and the pump device 12.

25 S2, Inject grout into the material bin 2 through the hopper 1, and activate the screw pump 3 in a forward direction. Feed the sleeve a of the prefabricated structure with grout. Detect flow and pressure of the grout in a real-time manner using the pressure sensor 5 and the flow meter 6 during grouting.

S3, When the sleeve a is clogged up, close the first valve 8 and the second valve 9, and open the third valve 10 and the pumping device 12.

S4, When the sleeve a is unclogged, re-open the first valve 8 and the second valve 9, and close the third valve 10 and the pumping device 12.

5 S5, When a cumulative grouting amount detected by the flow meter 6 reaches a required grouting amount for the sleeve a, finish the grouting of the sleeve a of the prefabricated structure.

10 In the construction method for the intelligent sleeve grouting apparatus for prefabricated structure in this embodiment, when the sleeve a is clogged up, the first valve 8 and the second valve 9 are closed, and the third valve 10 and the pumping device 12 are opened, so as to form a closed circulation system between the circulation pipeline 13 and the sleeve a. Since the sleeve a is in a clogged state, the pumping device 12 will cause a decrease in the pressure on the grout inlet side of the pumping device 12 and an increase in the pressure on the grout outlet side of the pumping device 12, thereby forming a pressure difference in the circulation system, so as to unclog the sleeve a. When the sleeve a is unclogged, the first valve 8 and the second valve 9 are re-opened, and the third valve 10 and the pumping device 12 are closed, and the grouting of the sleeve a can be continued.

15 In addition, when a closed circulation system is formed between the circulation pipeline 13 and the sleeve a, the reading of the pressure sensor 5 will change upon clogging or unclogging of the sleeve a. For example, referring to Fig. 4, when a pumping direction of the pumping device 12 is from bottom to top and when the sleeve a is clogged, the reading of the pressure sensor 5 will first decrease and then stabilize. When the sleeve a is unclogged, the reading of the pressure sensor 5 will increase and then stabilize. Therefore, the first valve 8, the second valve 9, the third valve 10 and the pumping device 12 can be automatically controlled through the control system by referring to the reading of the pressure sensor 5, so as to realize automatic grouting.

25 The above description is only a description of the preferred embodiments of the present invention, and is not intended to limit the scope of the present invention. Any changes and modifications made by those of ordinary skill in the art based on the above disclosure all belong to the protection scope of the claims.

CLAIMS

1. An intelligent sleeve grouting apparatus for a prefabricated structure, comprising a hopper (1), a material bin (2), a screw pump (3), a grouting pipe (4), a pressure sensor (5), a flow meter (6) and a control system, wherein:

5 the material bin (2) is connected to an outlet of the hopper (1);
 the screw pump (3) is arranged inside the material bin (2), and a grout outlet of the screw pump (3) extends out of the material bin (2);

 the grouting pipe (4) is connected to the grout outlet of the screw pump (3);

 the pressure sensor (5) is arranged at a grout outlet of the grouting pipe (4);

10 the flow meter (6) is arranged between the screw pump (3) and the grouting pipe (4);

 the control system is connected in signal to each of the screw pump (3), the pressure sensor (5) and the flow meter (6);

 the intelligent sleeve grouting apparatus for the prefabricated structure further comprises a circulation pipe (13) and a three-way valve (14);

15 an inlet of the circulation pipe (13) is arranged between the pressure sensor (5) and the grout outlet of the grouting pipe (4), an outlet of the circulation pipe (13) is connected to a first port of the three-way valve (14), and the circulation pipeline (13) is provided with a third valve (10), a one-way valve (11) and a pumping device (12);

 a second port of the three-way valve (14) is connected to a second valve (9);

20 a first valve (8) is provided upstream to the pressure sensor (5); and

 the control system is connected in signal to each of the first valve (8), the second valve (9), the third valve (10) and the pumping device (12).

2. The intelligent sleeve grouting apparatus for the prefabricated structure according to claim 1, further comprising a mobile terminal device, and the mobile terminal device is connected to the control system through wireless transmission.

3. The intelligent sleeve grouting apparatus for the prefabricated structure according to claim 1, wherein the screw pump (3) comprises an outer cylinder (31), a screw (32), a collector (33) and a base (34), wherein:

30 the screw (32) comprises a shaft (321), a first helical section (322) arranged on a surface of a lower section of the shaft (321), and a second helical section (323) arranged on a surface of an upper section of the shaft (321), wherein the first helical section (322) has a

helix that is smaller than a helix of the second helical section (323), wherein the first helical section (322) is arranged inside the outer cylinder (31), and the second helical section (323) is arranged outside the outer cylinder (31), wherein an upper end of the screw (32) is movably connected to the base (34);

5 the collector (33) is sleeved at an end of the second helical section (323) of the screw (32) and is fixedly connected to a grout inlet of the outer cylinder (31), wherein an inlet of the collector (33) has a size matching with a helical size of the second helical section (323).

4. The intelligent sleeve grouting apparatus for the prefabricated structure according to
10 claim 1, further comprising a moving trolley (7), and the material bin (2) is arranged on the moving trolley (7).

5. The intelligent sleeve grouting apparatus for the prefabricated structure according to
15 claim 1, further comprising a remote communication module and a client device, wherein each of the screw pump (3), the pressure sensor (5) and the flow meter (6) is connected in signal to the client device through the remote communication module.

6. A construction method for the intelligent sleeve grouting apparatus for the prefabricated structure according to any one of claims 1 to 5, comprising the following steps:

20 S1, engaging the grout outlet of the grouting pipe (4) with a grout feeding port of a sleeve (a), and engaging the third port of the three-way valve (14) with a grout discharge port of the sleeve (a); opening the first valve (8) and the second valve (9), and closing the third valve (10) and the pumping device (12);

 S2, injecting grout into the material bin (2) through the hopper (1), and activating the
25 screw pump (3) in a forward direction; feeding the sleeve (a) of the prefabricated structure with grout; detecting flow and pressure of the grout in a real-time manner using the pressure sensor (5) and the flow meter (6) during grouting;

 S3, when the sleeve (a) is clogged up, closing the first valve (8) and the second valve (9), and opening the third valve (10) and the pumping device (12);

30 S4, after the sleeve (a) is unclogged, re-opening the first valve (8) and the second valve (9), and closing the third valve (10) and the pumping device (12);

 S5, when a cumulative grouting amount detected by the flow meter (6) reaches a required grouting amount for the sleeve (a), finishing the grouting of the sleeve (a) of the fabricated structure.