(12) INNOVATION PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. **AU 2021102863 A4**

(54) Title
Maintenance Equipment for Anti-collision Wall of High-speed Railway Bridge and Vertical Wall of Cable Trough

(51) International Patent Classification(s)
E01F 15/08 (2006.01) ***E04G 21/24*** (2006.01)

(21) Application No: **2021102863** (22) Date of Filing: **2021.05.26**

(45) Publication Date: **2021.10.21**
(45) Publication Journal Date: **2021.10.21**
(45) Granted Journal Date: **2021.10.21**

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ABSTRACT

The utility disclosed a high speed railway bridge anti-collision wall and cable trough vertical wall maintenance equipment, which belongs to the technical field of concrete wall maintenance, including a maintenance frame, a walking trolley and a water supply system. The maintenance frame comprises a support frame and a cantilever frame, the support frame is a door -shaped frame arranged outside the anti-collision wall, and the cantilever is mounted on one side of the support frame and connected with the top of the support frame,the maintenance frame is provided with a plurality of sprinklers to the anti-collision wall and the vertical wall of the cable Trough;The walking trolley is arranged on the top of the support frame. The water supply system provides pressurized water to the sprinkler on the maintenance frame, and the maintenance frame runs along the top of the anti-collision wall driven by the walking trolley. In the operation process of the maintenance frame, the sprinkler on the support frame carries out spray maintenance on the anti-collision wall, and the sprinkler on the cantilever frame carries out spray maintenance on the vertical wall of the cable trough. The utility model has the advantages of convenient construction, high working efficiency, uniform spraying water and good effect of less water for maintenance, replacing the long-time repeated sprinkling maintenance operation by construction personnel.

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DRAWINGS

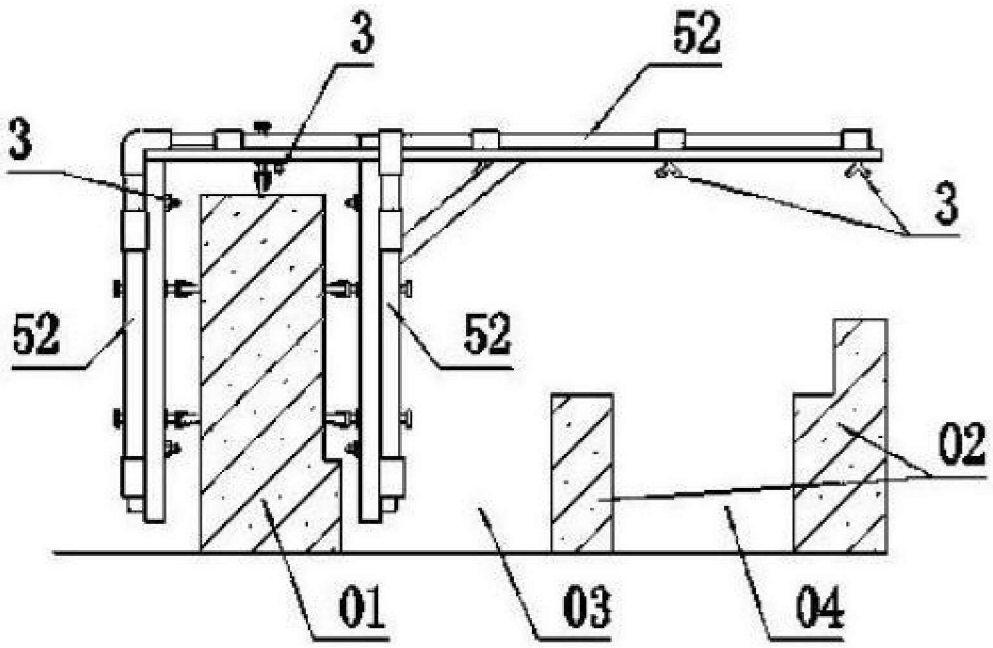


Fig.1

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SPECIFICATION

Maintenance Equipment for Anti-collision Wall of High-speed Railway Bridge and Vertical Wall of Cable Trough

TECHNICAL FIELD

The utility model belongs to the technical field of concrete wall maintenance, in particular to maintenance equipment for anti-collision wall of high-speed railway bridge and vertical wall of cable trough.

BACKGROUND OF TECHNOLOGY

In the auxiliary construction of high-speed railway bridge, after the concrete pouring of the anti-collision wall and vertical wall of cable trough at the top of the bridge is completed, the concrete shall be cured with the mold. After about 2 days, the strength shall meet the requirements of mold removal. The formwork shall be removed and the post-mold maintenance shall be carried out. In Fig. 1, the communication signal cable trough 03 is between the anti-collision wall 01 and the vertical wall of cable trough 02, and the power cable trough 04 is between the two vertical walls of cable trough 02. After concrete pouring, the climate is hot and dry, if does not carry on the concrete curing, the water in concrete will evaporate too fast, and lead to the cement particles has formed gel is not fully hydrated, Can not be transformed into stable crystallization, lack of enough cohesive force, thereby reducing concrete strength, when concrete has not had enough strength, the premature evaporation of moisture will also produce larger contraction deformation, appear stem shrinkage crack. The maintenance of the anti-collision wall of the bridge deck and the vertical wall of the cable trough cannot be carried out by large equipment. At present generally adopts the method of artificial water, need special construction personnel repeat sprinkler maintenance work for a long period of time, so that not only the construction cost is high, the construction efficiency is low, possibly because of construction personnel negligence maintenance is not timely, affect the strength of concrete, so the design can be automatically go line and at the same time to prevent the wall, and cable trough vertical curing device is necessary.

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SPECIFICATION

CONTENT OF UTILITY MODEL

The utility model aims to solve the technical problem that provides a device that can automatically run and simultaneously maintain the anti-collision wall and cable trough, and can be convenient to water and maintain the concrete anti-collision wall of the beam surface and the vertical wall of the cable trough, so as to improve the work efficiency, save costs and ensure the quality of maintenance.

In order to solve the above technical problems, the technical scheme adopted by the utility model is as follows:

The utility model relates to a maintenance equipment for anti-collision wall of high-speed railway bridge and vertical wall of cable trough, which comprises a maintenance frame, a trolley and a water supply system,the maintenance frame comprises a support frame arranged on the outside of the anti-collision wall and a cantilever frame arranged on the vertical wall of the cable trough, the support frame is set on the outside of the anti-collision wall, the cantilever frame is arranged on one side of the support frame, and the top of the support frame is connected with the support frame;The maintenance frame is provided with a plurality of sprinklers connected with the water supply system, through the sprinkler head to the anti-collision wall and cable trough vertical wall water;The trolley is arranged on the top of the support frame, and the trolley walks along the top of the anti-collision wall.

Preferably, the two walking trolleys are respectively driven by different motors, and the motors are electrically connected with the controller.

Preferably, the water supply system comprises a water tank, a water pump and a water pipe. The water tank is sent to the water pipe through a water pump, a number of sprinklers are connected with the water pipe, and the water pump is electrically connected with the controller.

Preferably, the water pipe comprises a connecting pipe, a main pipe and a branch pipe connected in parallel with the main pipe, one end of the connecting pipe is connected with the water pump outlet, the other end is connected with the main pipe, the main pipe and the branch pipe are arranged on the maintenance frame;The main pipe is three, a horizontal setting, two vertical setting, vertical setting of the main pipe are

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connected with the horizontal setting of the main pipe;The horizontal main pipe is arranged on the top end of the support frame and the cantilever frame, and the vertical main pipe is arranged on the lateral end of the vertical part of the support frame;The branch pipe is a plurality of branch pipes, a plurality of branch pipes are arranged in parallel on the maintenance frame, one end of the branch pipe is closed, the other end is communicated with the main pipe.

Preferably, the connecting pipe is a hose, and the main pipe and branch pipe are PVC pipes.

Preferably, the water tank is arranged on the mobile device, and the water pump is arranged in the water tank.

Preferably, the sprinkler is an atomizer, and the atomizer is distributed on the pipe wall of the branch pipe.

Preferably, the sprinkler spacing is 15cm;The end distance of the cantilever frame is 1.4m from the support frame

Preferably, the vertical part of the support frame is provided with a pulley in contact with the two sides of the anti-collision wall, and the two sides of the anti-collision wall are respectively provided with two rows of pulleys; and the pulley is connected with the support frame through an adjusting bolt.

Preferably, the support frame and the cantilever frame are made of steel pipes, and the cantilever frame is a plurality of parallel steel pipes.

The beneficial effects of the above technical solutions are as follows: compared with the existing technology, the utility model provides pressurized water to the sprinkler of the maintenance frame through the water supply system, and the maintenance frame runs along the top of the anti-collision wall driven by the walking trolley,during the operation of the maintenance frame, the sprinkler on the support frame carries out spray maintenance on the anti-collision wall, and the sprinkler on the cantilever frame carries out spray maintenance on the vertical wall of the cable trough.

FIGURE LEGENDS

The following is a further detailed description of the utility model in combination with the attached drawings and specific implementation methods.

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SPECIFICATION

Fig.1 is the use state diagram of a maintenance equipment for anti-collision wall of high-speed railway bridge and vertical wall of cable trough provided by the embodiment of the utility model;

Fig.2 is a structural schematic diagram of a high-speed railway bridge anti-collision wall and vertical wall maintenance equipment of cable trough provided by an embodiment of the utility model;

Fig.3 is the left view of the maintenance frame in Fig. 2;

Fig.4 is a top view of Fig. 3;

Fig.5 is the structure diagram of the maintenance frame in Fig. 2;

Fig.6 is the left view of Fig. 5;

Fig.7 is a top view of Fig. 6

In the picture: 01- anti-collision wall, 02- vertical wall of cable trough, 03- communication signal cable trough 04- power cable trough, 1- maintenance frame, 11- support frame, 110- beam, 111- pillar;12- cantilever frame, 13- inclined pole, 2- trolley, 3 - sprinkler, 4 - water tank, 5- water pipe, 51- connecting pipe, 52- main pipe, 53- branch pipe, 6 - pulley, 7- adjusting bolts.

MODE OF CARRYING OUT THE INVENTION

The following is an explicit and complete description of the technical scheme in the embodiments of the utility model in combination with the attached drawings in the embodiments of the utility model. Obviously, the described embodiments are only part of the embodiments of the utility model, but not all of the embodiments. Based on the embodiments in the utility model, all other embodiments obtained by ordinary technicians in the field without making creative labor fall within the scope of protection of the utility model.

A maintenance equipment for anti-collision wall of high-speed railway bridge and vertical wall of cable trough, as shown in Figure 1-7, comprises a maintenance frame 1, a trolley 2 and a water supply system, the maintenance frame 1 comprises a support frame 11 arranged on the outside of the anti-collision wall 01 and a cantilever frame 12 arranged above the vertical wall 02 of the cable trough, the support frame 11 is set on the outside of the anti-collision wall 01 door-shaped frame, the cantilever frame 12

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is arranged on one side of the support frame 11, and is connected with the top of the support frame 11; the maintenance frame 1 is provided with a plurality sprinkler 3 connected with the water supply system, through the sprinkler 3 to the anti-collision wall 01 and cable trough vertical wall 02 water; the trolley 2 is designed as two, the two trolleys 2 are arranged on the top of the support frame 11 at intervals, and the two trolleys 2 walk along the top of the anti-collision wall 01. The sprinkler head on the maintenance frame is provided with pressurized water through the water supply system, and the maintenance frame runs along the top of the anti-collision wall driven by the trolley. In the operation process of the maintenance frame, the sprinkler head on the support frame carries out spray maintenance on the anti-collision wall, and the sprinkler head on the cantilever frame carries out spray maintenance on the vertical wall of the cable trough. According to actual needs, the trolley can be electric or manual.

As a preferred structure, as shown in Fig.7, the two trolleys 2 are respectively driven by different motors, which are electrically connected with the controller (not shown in the figure). Through the relay in the controller to control the two trolleys, the two trolleys respectively set the program to control the walking time and speed. When the front trolley is walking, the rear front trolley is driven and is not powered on. When the rear front trolley is walking, the front trolley is driven and is not powered on. In this way, the two walking trolleys can be energized in turn to realize the maintenance frame running in two directions. Set according to the data obtained from the actual situation to control the running interval and speed of the trolley.

In a preferred embodiment of the utility model, as shown in Fig. 2, the water supply system comprises a water tank 4, a water pump (not drawn in the figure) and a water pipe 5, the water tank 4 through the water pump will be sent to the water pipe 5, a number of sprinklers 3 are connected with the water pipe 5, the water pump and the controller is electrically connected. When the maintenance frame moves, the controller controlling the water pump continues to work. When the two walking trolleys stop and the maintenance frame stands still, the controller controlling the water pump will power off and the sprinkler will stop spraying water.

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In a specific embodiment of the utility model, as shown in Fig. 1-4, the water pipe 5 comprises a connecting pipe 51, a main pipe 52 and a branch pipe 53 connected in parallel with the main pipe 52, one end of the connecting pipe 51 is connected with the water pump outlet, the other end is connected with the main pipe 52, the main pipe 52 and the branch pipe 53 are arranged on the maintenance frame 1; The main pipe 52 is three, a horizontal setting, two vertical setting, the vertical setting main pipe 52 are connected with the horizontal setting main pipe 52; The horizontal main pipe 52 is arranged on the top end of the support frame 11 and the cantilever frame 12, and the vertical main pipe 52 is arranged on the lateral end of the vertical part of the support frame 11; The branch pipe 53 is a plurality, and a plurality of branch pipes 53 are arranged in parallel on the maintenance frame 1. One end of the branch pipe 53 is closed, and the other end is communicated with the main pipe. The vertical part of the support frame 11 on both sides of the interval is provided with more than two middle beam 110, the middle beam 110 for supporting branch pipe 53; The middle beam 110 is welded and fixed on pillar 111. Start the water pump, distribute the pressurized water through the connecting pipe and main pipe to different branch pipes, and then spray out through each sprinkler to realize the sprinkling maintenance of the anti-collision wall and the vertical wall of the cable trough.

In order to facilitate the movement with the maintenance frame, the connecting pipe 51 chooses hose, and the main pipe 52 and branch pipe 53 are PVC pipes, which are easy to make and light to run.

Because the length of the anti-collision wall and the vertical wall of the cable trough is large, the water tank 4 is arranged on the moving device, and the water pump is arranged in the water tank 4. By adopting this external water storage measure, there is no water tank at the upper part of automatic move maintenance frame, so as to ensure the stability of the device and reduce the influence on the anti-collision wall which supports and stabilizes and does not reach the design strength.

In order to ensure the curing effect, the sprinkler 3 adopts the atomizing sprinkler, and the atomizing sprinkler is distributed on the pipe wall of the branch pipe 53.

In the construction process, the sprinkler head 3 spacing can be selected 15cm; the

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end distance of the cantilever frame 12 from the support frame 11 is 1.4m, which can satisfy the maintenance of the anti-collision wall and the vertical wall of the cable trough at the same time. Furthermore, the length of the hose is set at 20 meters and moves back and forth with the maintenance frame.

In addition, the vertical part of the support frame 11 is provided with a pulley 6 and the two sides of the collision wall 01 contact, the two sides of the collision wall 01 are respectively provided with two rows of pulley 6; and the pulley 6 is connected with the support frame 11 by adjusting the bolt 7. The same pulley 6 is installed in the middle position of the top of the support frame to ensure the smooth operation of the support frame. When the walking trolley is used manually, six rows of pulleys are selected on the top and both sides of the support frame 11. The top pulley is used as the walking trolley, and the pulleys on both sides contact the surface of the anti-collision wall to ensure the stability of the support frame in the process of walking. When the walking trolley is electric, the two ends of the top of the support frame are driven by a motor.

When the specific processing is made, the support frame 11 and the cantilever frame 12 are made of square steel pipe, and the cantilever frame is arranged in parallel with a number of steel pipes, and the vertical part of the cantilever frame and the support frame is provided with a diagonal rod 13. The size of the support frame is slightly larger than the width of the anti-collision wall, and the steel pipe of the cantilever frame is arranged vertically with the branch pipe.

The specific working process of the utility model is as follows: through the controller in the distribution box to control the trolley at one end of the support frame, in order to prevent the concrete surface on the top of the wall from hitting the reference surface. Through the relay control device in the controller, the two trolleys are set up separately. The support frame moves by pulling the walking trolley at one end, while the walking trolley on the other side has no power to follow. After changing direction, the active driven walking trolley is transformed. 5 rows of symmetrical pulleys are arranged on the support frame, with two rows on both sides and one at the top. The outer side of the pulley and the steel pipe of the support frame are bolted and can be

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adjusted for tightness. The inner side of the pulley is tightly attached to the concrete anti-collision wall. The pulleys on both sides of the anti-collision wall hold the anti-collision wall tightly to stabilize the support frame; The maintenance frame and the door-shaped support frame are provided with PVC branch pipe, and the wall of the pipe is evenly provided with atomizers. When the branch pipe enters the pressurized water, the concrete is sprayed through the sprinkler to achieve the purpose of wet concrete.

In conclusion, the utility model has the following advantages:

1. The utility model has the advantages of simple structure, easy processing and low cost, and is arranged on the poured anti-impact wall through the door-shaped support frame, and moves the sprinkling maintenance by itself, which takes the place of the long-time repeated sprinkling maintenance operation by the construction personnel, and makes the construction convenient and improves the efficiency.

2. The utility model adopts automatic moving sprinkling maintenance. As long as the working time interval, speed and other parameters are set according to the actual situation of the site, the utility model can maintain by itself, reduce artificial access, and reduce the concrete quality problems caused by artificial maintenance in individual time.

3. The utility model adopts an external water storage tank, and no water tank is arranged on the part of the automatic moving maintenance frame, so as to ensure the stability of the device and reduce the influence on the anti-collision wall which plays a supporting and stabilizing role and does not reach the design strength.

4. The utility model has light weight, and each component is easy to disassemble and move. After a section of the beam maintenance is completed, the maintenance operation is easy to be carried out forward, and a better flow maintenance construction can be organized.

5. The utility model adopts a new atomizer, which has the advantages of uniform sprinkling, less waste of maintenance water, energy saving and environmental protection.

6. The utility model has wide coverage of atomizing sprinkler and good curing effect.

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In the above description describes many details in order to fully understand the utility model, but the utility model can also be implemented in other ways different from the description. The technical personnel in this field may make similar promotion without violating the connotation of the utility model, so the utility model is not restricted by the specific embodiments disclosed above.

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CLAIMS

1. The utility model relates to a maintenance equipment for anti-collision wall of high-speed railway bridge and vertical wall of cable trough, which has the following characteristics: Comprises a maintenance frame, a trolley and a water supply system, the maintenance frame comprises a support frame arranged on the outside of the anti-collision wall and a cantilever frame arranged on the vertical wall of the cable trough, the support frame is set on the outside of the anti-collision wall, the cantilever frame is arranged on one side of the support frame, and the top of the support frame is connected with the support frame;The maintenance frame is provided with several sprinklers connected with the water supply system, through the sprinkler head to the anti-collision wall and cable trough vertical wall water;The walking trolley is arranged on the top of the support frame, and the walking trolley walks along the top of the anti-collision wall.

2. According to claim 1, the described maintenance equipment for the anti-collision wall of high-speed railway bridge and vertical wall of cable trough is characterized by two trolleys driven by different motors respectively, and the motors are electrically connected with the controller.

3. According to claim 2, the described maintenance equipment for the anti-collision wall of high-speed railway bridge and vertical wall of cable trough is characterized by the water supply system including water tank, water pump and water pipe. The water tank sends the water pump to the water pipe through the water pump, several sprinklers are connected with the water pipe, and the water pump is electrically connected with the controller.

4. According to claim 3, the described maintenance equipment for anti-collision wall of high-speed railway bridge and vertical wall of cable trough is characterized by the water pipe comprises a connecting pipe, a main pipe and a branch pipe connected in parallel with the main pipe, one end of the connecting pipe is connected with the water pump outlet, the other end is connected with the main pipe, the main pipe and the branch pipe are arranged on the maintenance frame;The main pipe is consist of by a horizontal setting and two vertical setting, the vertical setting of the main pipes are connected with the horizontal setting of the main pipe;The horizontal main pipe is

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arranged on the top end of the support frame and the cantilever frame, and the vertical main pipe is arranged on the lateral end of the vertical part of the support frame;The branch pipe is a plurality of branch pipes, a plurality of branch pipes are arranged in parallel on the maintenance frame, one end of the branch pipe is closed, the other end is communicated with the main pipe.

5. According to claim 4, the described maintenance equipment for the anti-collision wall of high-speed railway bridge and vertical wall of cable trough is characterized by the connecting pipe is a hose, and the main pipe and branch pipe are PVC pipes.

6. According to claim 3, the described maintenance equipment for anti-collision wall of high-speed railway bridge and vertical wall of cable trough is characterized by the water tank being arranged on the moving device, and the water pump is arranged in the water tank.

7. According to claim 4, the described maintenance equipment for anti-collision wall of high-speed railway bridge and vertical wall of cable trough is characterized by the sprinkler as an atomizer, and the atomizer is distributed on the pipe wall of the branch pipe.

8. According to claim 1, the described maintenance equipment for the anti-collision wall of high-speed railway bridge and vertical wall of cable trough is characterized by the sprinkler spacing is 15cm

9. According to claim 3, the described maintenance equipment for the anti-collision wall of high-speed railway bridge and vertical wall of cable trough is characterized by the vertical part of the support frame is provided with a pulley in contact with the two sides of the anti-collision wall, and two rows of pulleys are respectively provided on both sides of the anti-collision wall; and the pulley is connected with the support frame through an adjusting bolt.

10. According to claim 1-9, the described maintenance equipment for the anti-collision wall of high-speed railway bridge and vertical wall of cable trough is characterized by the vertical part of the support frame is provided with a pulley in contact with the two sides of the anti-collision wall, and two rows of pulleys are respectively provided on both sides of the anti-collision wall; And the pulley is

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connected with the support frame through an adjusting bolt.

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DRAWINGS

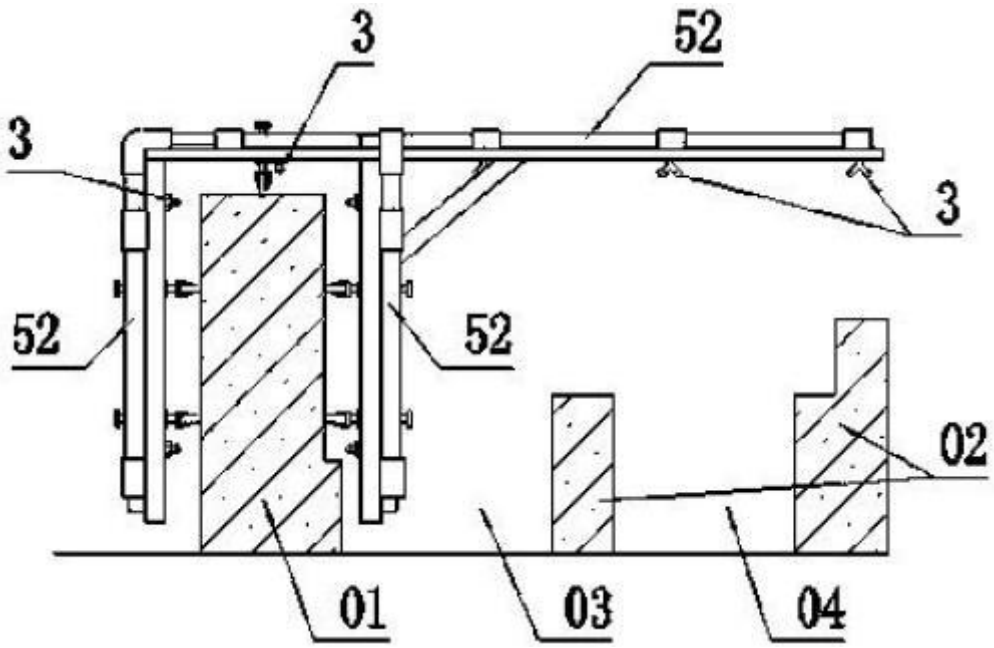


Fig.1

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DRAWINGS

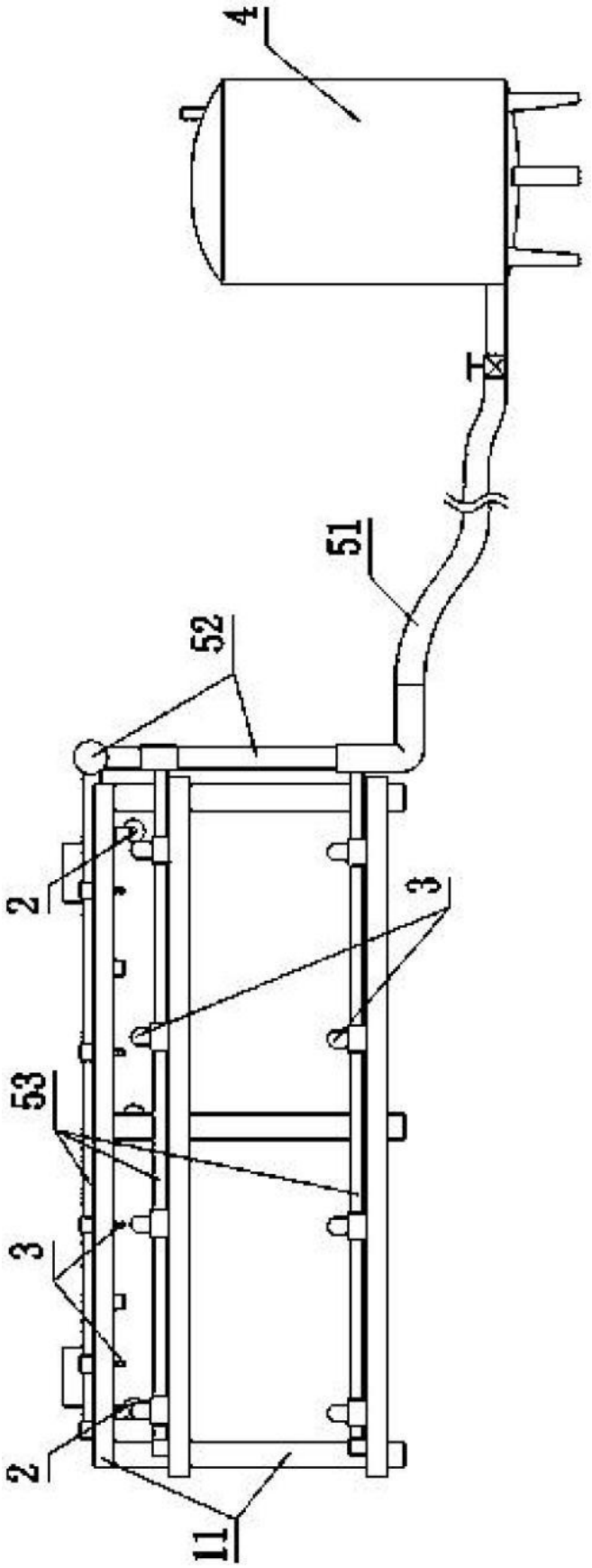


Fig.2

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DRAWINGS

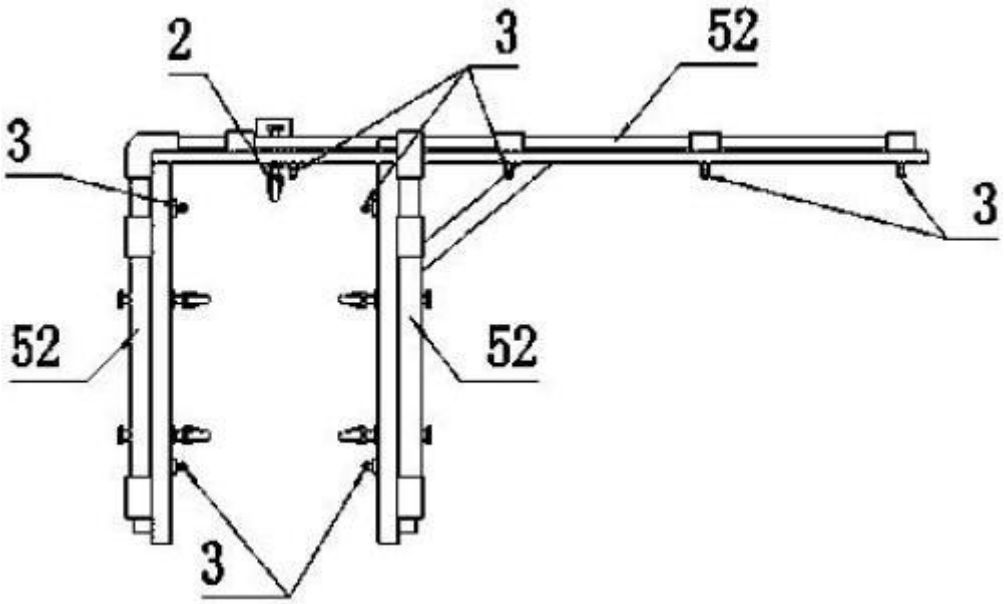


Fig.3

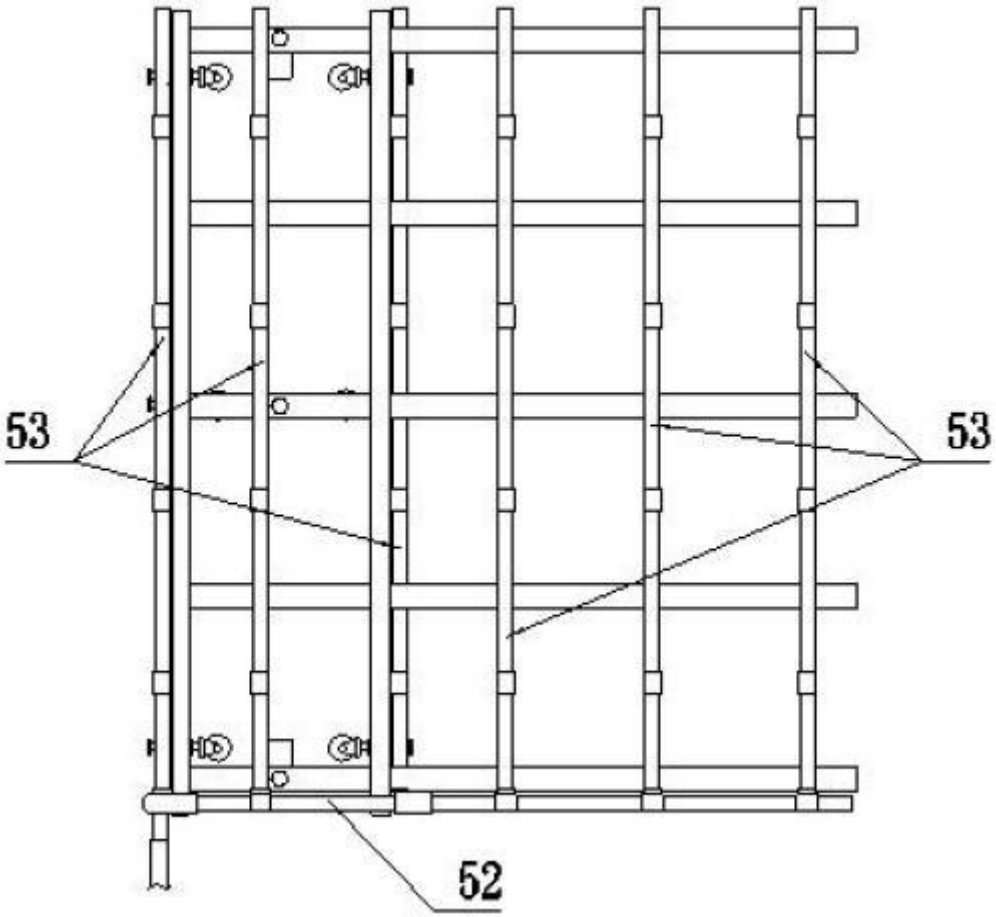


Fig.4

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DRAWINGS

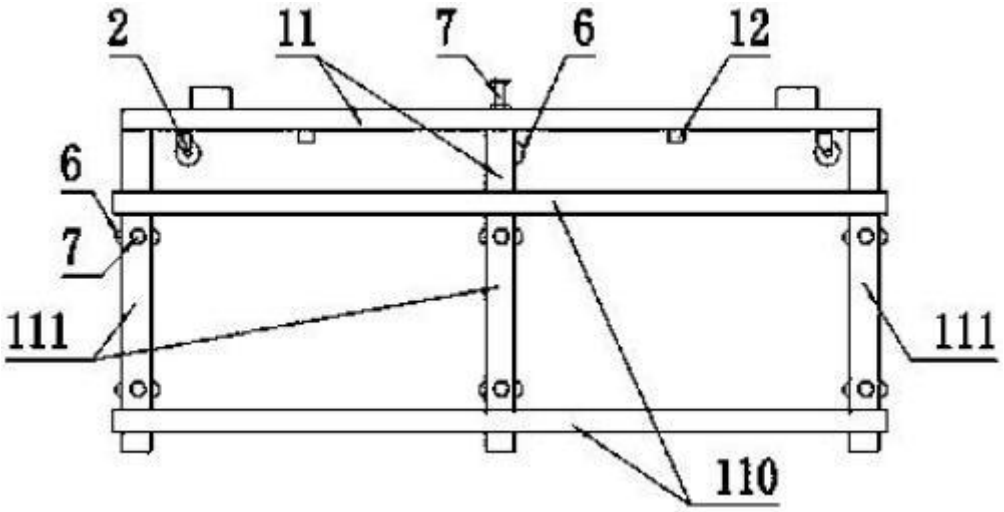


Fig.5

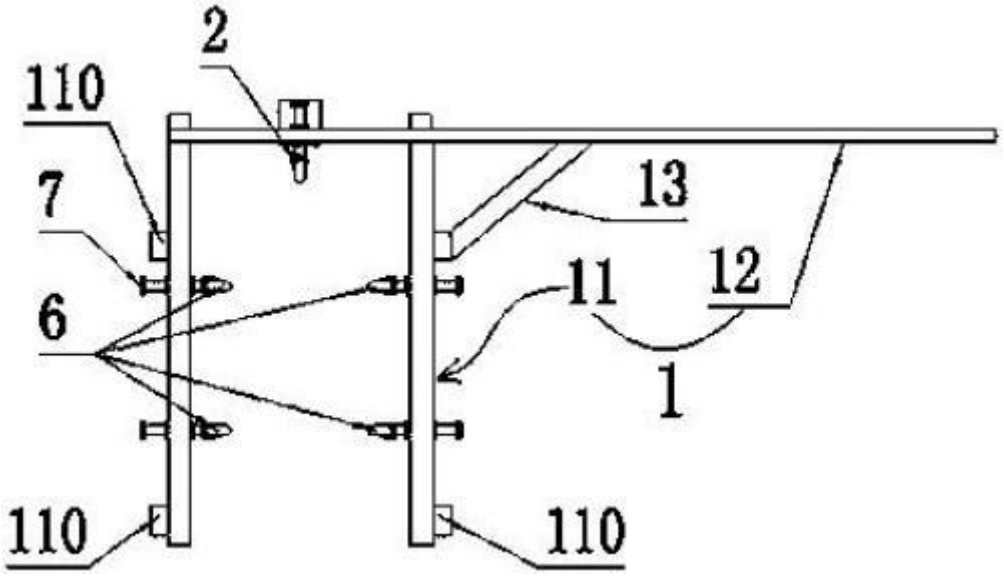


Fig.6

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DRAWINGS

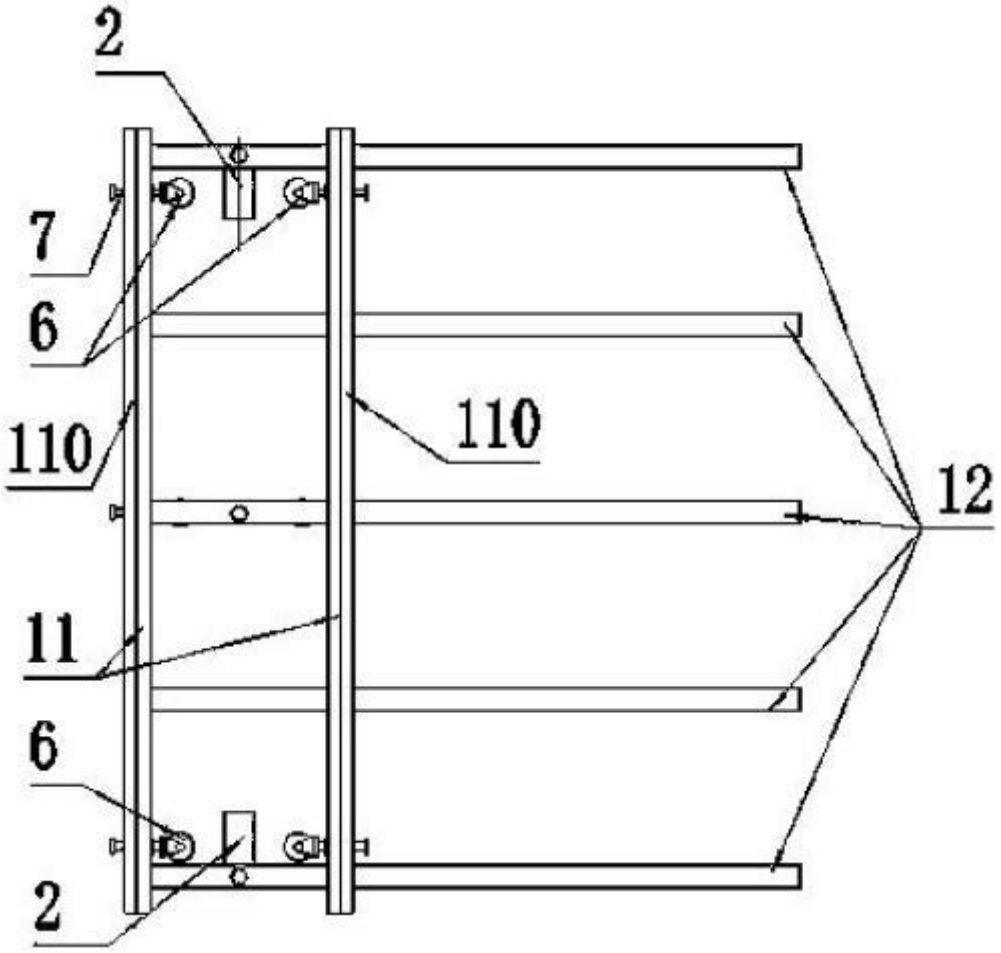


Fig.7