

# **A ROOF TANK CLEANING MACHINE**

## **FIELD OF THE INVENTION**

The present invention relates to the technical field of property public resource facility management, in particular to a roof water tank cleaning machine.

## **BACKGROUND OF THE INVENTION**

Generally, for cleaning the existing fresh water tanks on the roof of the property, personnel are sent to climb into the water tank and use a brush to wash the scale and metal rust on the floor and the four walls of the water tank, then rinse off the remaining dirt with a water spray device. The personnel themselves have the problem of unclean soles carrying bacteria and safety working in confined spaces. The property characteristics of the urban areas of Asian metropolises are dense population, and the water tanks are small and integrated with the building structure. There are some robots for cleaning water tanks in foreign countries, mainly for the bottom of huge industrial water tanks, or the small and narrow environment of sewers, these robots for cleaning water tanks do not need to clean vertical walls beyond the floor of the narrow environment for urban properties in Asian metropolises.

Some foreign robot products for cleaning water tanks can be completed by a powerful water spray head to clean the vertical walls outside the ground in a narrow environment, but this requires a large and powerful water pump to assist nearby, and it is also a waste of water. And some of them can only be reached by climbing up a narrow stair. Due to the environment of the water tank on the roof of the metropolitan property, in addition to requiring as few manpower as possible, it can be carried to the location of the water tank on the roof by climbing the stairs. The water tank opening is generally a narrow entrance and needs a small size robot to be hoisted into the tank.

Therefore, there are deficiencies in the prior art that need to be improved.

## **SUMMARY OF THE INVENTION**

In view of the aforesaid drawbacks of the prior art, the present invention provides a roof tank cleaning machine.

So, the invention provides a roof tank cleaning machine, comprising a crawler vehicle chassis, the top of the crawler vehicle chassis is provided with a screw driving motor for a lifting platform, a balanced support telescopic rod is provided at one end of the screw driving motor, a support wheel is provided at the other end of the balanced support telescopic rod; the top of the crawler vehicle chassis is provided with a scissor lifting structure of the lifting platform, the other end of the scissor lifting structure is provided with a top base of the lifting platform, one end of the top base of the lifting platform is provided with a sliding rail and a support for a scrubbing head, one end of the sliding rail and the support is provided with a scrubbing head sliding motor, the other end of the scrubbing head sliding motor is provided with a scrubbing head sliding transmission belt, the other end of the scrubbing head sliding transmission belt is provided with a scrubbing head slide running screw, a scrubbing device is arranged outside the scrubbing head slide running screw.

Furthermore, linkage mechanisms for the balanced support and the lifting platform are arranged between the crawler vehicle chassis and the scissor lifting structure, the linkage structure is fixedly connected to the top of the crawler vehicle chassis.

Furthermore, a support rod is provided between the linkage mechanisms of the balanced support and the lifting platform, and a slide rail of the lifting platform is arranged outside the support rod..

Furthermore, the support rod is rotationally connected to the scissor lifting structure of the lifting platform, and one end of the screw driving motor for the lifting platform is connected to the support rod by a thread.

Furthermore, one end of the scrubbing device is provided with a rotating motor for the scrubbing head, and the rotating motor is connected in rotation with the scrubbing device.

Furthermore, the inside of the top base of the lifting platform is provided with an extending vertical push rod of the scrubbing head and the extending vertical pushing rod is fixedly connected to the sliding rail and the support.

Furthermore, the size of the crawler chassis is not more than 55×55cm.

Furthermore, the effective length of the scissor lifting structure of the lifting platform is 3m.

Furthermore, the effective length of the scrubbing head slide running screw is 1m.

Furthermore, the scissor lifting structure of the lifting platform is made of

copper-aluminium alloy.

Compared with the prior art, the invention has the following advantages:

The said crawler chassis can provide sufficient stability for the device. When in use, the device is put into the water tank on the roof, the screw driving motor for the lifting platform on one side of the crawler chassis adjusts the balanced support telescopic rod to control the position of the support wheels for lowering the center of gravity of the device and improving the stability of the device to clean the inside of the roof water tank.

The scissor lifting structure of the lifting platform can put the main body of the device in from the opening of the water tank on the roof. When in use, the scissor lifting structure of the lifting platform is adjusted to a folded state, so that the whole machine can be put into the water tank, and when cleaning the inside of the water tank, the position of the top base of the lifting platform can be adjusted by the scissor lifting structure of the lifting platform, so that the scrubbing device installed at one end of the top base of the lifting platform can clean the inside of the water tank. On the other hand, the effective length of the scissor lifting structure of the lifting table is three meters, so the device cooperates with the crawler vehicle to clean the interior of the water tank in all directions;

The scrubbing device can clean the interior of the water tank on the roof. When in use, the scrubbing head sliding motor rotates, and the scrubbing head sliding transmission belt can drive the scrubbing head slide running screw to rotate, so as to achieve the purpose of driving the scrubbing device to move up and down, and to facilitate the cleaning of the water tank wall back and forth. At the same time, the rotating motor for the scrubbing head can be used to drive the scrubbing device to rotate, thereby effectively improving the cleaning efficiency of the scrubbing device.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

For illustrating the scheme in the present invention more clearly, the accompanying drawings that need to be used in the description of the embodiments of the invention will be briefly introduced below. Obviously, the accompanying drawings in the following description are some embodiments of the invention. For those skilled in the art, other drawings can also be obtained based on these drawings without creative effort.

Fig. 1 is the schematic structural view of the roof water tank cleaning machine provided by the invention.

Fig. 2 is a structural schematic diagram of the top base of the lifting platform in the roof water tank cleaning machine provided by the invention.

Fig. 3 is a structural schematic diagram of the scissor lifting structure of the lifting platform in the roof water tank cleaning machine provided by the invention.

Fig. 4 is a schematic structural view of the crawler chassis of the roof water tank cleaning machine provided by the invention.

Explanation of reference labels:

1. the crawler vehicle chassis; 2. the balanced support telescopic rod; 201. the support wheel; 3. the support rod; 301. the slide rail of the lifting platform; 4. the screw driving motor for a lifting platform; 5. the scissor lifting structure of the lifting platform; 6. the top base of the lifting platform; 7. the sliding rail and the support for the scrubbing head; 8. the rotating motor for the scrubbing head; 9. the scrubbing head sliding motor; 10. the scrubbing head sliding transmission belt; 11. the scrubbing device; 12. the scrubbing head slide running screw; 13. the extending vertical push rod of the scrubbing head; 14. the linkage mechanisms of the balanced support and the lifting platform.

## **DESCRIPTION OF THE EMBODIMENTS**

The preferred embodiments of the invention will be described in detail below in conjunction with the accompanying drawings, so that the advantages and characteristics of the invention can be more easily understood by those skilled in the art, so that the protection scope of the invention can be defined more clearly. Apparently, the described embodiments are only some of the embodiments of the present invention, but not all of them. Based on the embodiments of the present invention, all other embodiments obtained by persons of ordinary skill in the art without

making creative efforts belong to the protection scope of the present utility model.

The terms "comprising" and "having" in the specification and claims of the present invention and the description of the drawings above, as well as any variations thereof, are intended to cover a non-exclusive inclusion. The terms "first", "second" and the like in the specification and claims of the present utility model or the above drawings are used to distinguish different objects, rather than to describe a specific sequence.

Please refer to Fig. 1-4, the roof water tank cleaning machine comprises a crawler vehicle chassis 1, the top of the crawler vehicle chassis 1 is provided with a screw driving motor 4 for a lifting platform, a balanced support telescopic rod 2 is provided at one end of the screw driving motor 4, a support wheel 201 is provided at the other end of the balanced support telescopic rod 2; the top of the crawler vehicle chassis 1 is provided with a scissor lifting structure 5 of the lifting platform, the other end of the scissor lifting structure 5 is provided with a top base 6 of the lifting platform, one end of the top base 6 of the lifting platform is provided with a sliding rail and a support 7 for a scrubbing head, one end of the sliding rail and the support 7 is provided with a scrubbing head sliding motor 9, the other end of the scrubbing head sliding motor 9 is provided with a scrubbing head sliding transmission belt 10, the other end of the scrubbing head sliding transmission belt 10 is provided with a scrubbing head slide running screw 12, a scrubbing device 11 is arranged outside the scrubbing head slide running screw 12. The screw driving motor 4 for the lifting platform on one side of the crawler chassis 1 adjusts the balanced support telescopic rod 2 to control the position of the support wheels 201 for lowering the center of gravity of the device and improving the stability of the device to clean the inside of the roof water tank.

The invention, preferably, linkage mechanisms 14 for the balanced support and the lifting platform are arranged between the crawler vehicle chassis 1 and the scissor lifting structure 5, the linkage structure 14 is fixedly connected to the top of the crawler vehicle chassis 1.

The invention, preferably, the support rod 3 is provided between the linkage mechanisms 14 of the balanced support and the lifting platform, and a slide rail 301 of the lifting platform is arranged outside the support rod 3, the support rod 3 is rotationally connected to the scissor lifting structure 5 of the lifting platform, and one end of the screw driving motor 4 for the lifting platform is connected to the support rod 4 by a thread..

The invention, preferably, one end of the scrubbing device 11 is provided with the rotating

motor 8 for the scrubbing head, and the rotating motor 8 is connected in rotation with the scrubbing device 11. The inside of the top base 6 of the lifting platform is provided with an extending vertical push rod 13 of the scrubbing head and the extending vertical pushing rod 13 is fixedly connected to the sliding rail and the support 7.

The invention, preferably, the size of the crawler chassis 1 is not more than 55×55cm, and the effective length of the scissor lifting structure 5 of the lifting platform is 3m.

The invention, preferably, the effective length of the scrubbing head slide running screw 12 is 1m, and the scissor lifting structure 5 of the lifting platform is made of copper-aluminium alloy

The said crawler chassis 1 can provide sufficient stability for the device. When in use, the device is put into the water tank on the roof, the screw driving motor 4 for the lifting platform on one side of the crawler chassis 1 adjusts the balanced support telescopic rod 2 to control the position of the support wheels 201 for lowering the center of gravity of the device and improving the stability of the device to clean the inside of the roof water tank. And, the scissor lifting structure 5 of the lifting platform can put the main body of the device in from the opening of the water tank on the roof. When in use, the scissor lifting structure 5 of the lifting platform is adjusted to a folded state, so that the whole machine can be put into the water tank, and when cleaning the inside of the water tank, the position of the top base 6 of the lifting platform can be adjusted by the scissor lifting structure 5 of the lifting platform, so that the scrubbing device 11 installed at one end of the top base 6 of the lifting platform can clean the inside of the water tank. On the other hand, the effective length of the scissor lifting structure 5 of the lifting table is three meters, so the device cooperates with the crawler vehicle chassis 1 to clean the interior of the water tank in all directions. The scrubbing device 11 can clean the interior of the water tank on the roof. When in use, the scrubbing head sliding motor 9 rotates, and the scrubbing head sliding transmission belt 10 can drive the scrubbing head slide running screw 12 to rotate, so as to achieve the purpose of driving the scrubbing device 11 to move up and down, and to facilitate the cleaning of the water tank wall back and forth. At the same time, the rotating motor 8 for the scrubbing head can be used to drive the scrubbing device 11 to rotate, thereby effectively improving the cleaning efficiency of the scrubbing device 11.

The above description is only used to illustrate the technical solution of the invention, rather than to limit it; although the invention has been described in detail with reference to the

aforementioned embodiments, those of ordinary skill in the art should understand that: it can still be used for the aforementioned implementation or modification of the technical solutions recorded in the example, or equivalent replacement of some or all of the technical features; any equivalent structure or equivalent process transformation made by using the description and drawings of the utility model, or directly or indirectly used in other related All technical fields are all included in the scope of patent protection of the utility model in the same way.

### **Claim**

1. A roof tank cleaning machine, comprising a crawler vehicle chassis, the top of the crawler vehicle chassis is provided with a screw driving motor for a lifting platform, a balanced support telescopic rod is provided at one end of the screw driving motor, a support wheel is provided at the other end of the balanced support telescopic rod; the top of the crawler vehicle chassis is provided with a scissor lifting structure of the lifting platform, the other end of the scissor lifting structure is provided with a top base of the lifting platform, one end of the top base of the lifting platform is provided with a sliding rail and a support for a scrubbing head, one end of the sliding rail and the support is provided with a scrubbing head sliding motor, the other end of the scrubbing head sliding motor is provided with a scrubbing head sliding transmission belt, the other end of the scrubbing head sliding transmission belt is provided with a scrubbing head slide running screw, a scrubbing device is arranged outside the scrubbing head slide running screw.
2. The roof tank cleaning machine of claim 1, wherein linkage mechanisms for the balanced support and the lifting platform are arranged between the crawler vehicle chassis and the scissor lifting structure, the linkage structure is fixedly connected to the top of the crawler vehicle chassis.
3. The roof tank cleaning machine of claim 2, wherein a support rod is provided between the linkage mechanisms of the balanced support and the lifting platform, and a slide rail of the lifting platform is arranged outside the support rod.
4. The roof tank cleaning machine of claim 3, wherein the support rod is rotationally connected to the scissor lifting structure of the lifting platform, and one end of the screw driving motor for the lifting platform is connected to the support rod by a thread.
5. The roof tank cleaning machine of claim 1, wherein one end of the scrubbing device is provided with a rotating motor for the scrubbing head, and the rotating motor is connected in rotation with the scrubbing device.
6. The roof tank cleaning machine of claim 1, wherein the inside of the top base of the lifting platform is provided with an extending vertical push rod of the scrubbing head and the extending vertical pushing rod is fixedly connected to the sliding rail and the support.
7. The roof tank cleaning machine of claim 1, wherein the size of the crawler chassis is not

more than 55×55cm.

8. The roof tank cleaning machine of claim 1, wherein the effective length of the scissor lifting structure of the lifting platform is 3m.
9. The roof tank cleaning machine of claim 1, wherein the effective length of the scrubbing head slide running screw is 1m.
10. The roof tank cleaning machine of claim 1, wherein the scissor lifting structure of the lifting platform is made of copper-aluminium alloy.