

Design of Q378 Hook Type Blasting Machine

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Abstract

The machine adopts a hook hanging carrying mode, and in the shot blasting cleaning chamber, the workpiece is rotated by the driving side of the spreader to receive the projecting of the blasting machine arranged on the upper and lower sides of the side, and the production efficiency is high. The shot blasting machine adopts the structure of no pit, convenient installation, compact structure, good cleaning quality, safe and reliable work, stable operation and reduced investment cost.

Faced with the increasing use of shot blasting machines, it is necessary to improve the design and use of shot blasting machines. Q378 shot blasting machine technology has been relatively mature. This paper draws on the design of Q378 and references the data parameters of existing products. The execution components can basically meet the requirements of motion form, motion law and function range, and the structure is simple. The design and the partial data of the existing products are referenced in this design. The design process begins with the blasting machine, followed by the selection of the bucket elevator and the screw conveyor.

Keywords

Blasting machine; Q378; hook type.

1. Topic Background

In Europe and the United States, the waterproof layer has been widely used in concrete bridge decking since the 1970s, which greatly reduces the damage caused by water seepage of concrete bridges and prolongs the service life of bridges. However, with the increase in traffic volume, there have been cases where the waterproof layer and the surface layer and the bridge deck have insufficient bonding strength to cause a change. In China, concrete bridges often have similar diseases, as well as loose and falling concrete due to water seepage, and steel corrosion. One of the reasons for the above diseases is that the treatment of the hook-type shot blasting machine of the concrete surface layer does not completely remove the surface residual material, and does not retain a certain rough surface to ensure the bonding strength of the waterproof layer and the bottom layer of the bridge deck[1].

2. Research Status

The world's first hook-type shot blasting machine was born 100 years ago. It began to remove impurities, scales and increase roughness on various metal or non-metal surfaces. Hook type shot blasting machine treatment is a surface treatment method of hook type shot blasting machine which has been applied in developed countries in Europe and America. After a hundred years of development, the hook-type shot blasting machine processing technology and equipment have been quite mature, and its application fields have rapidly expanded to concrete surface coating treatment and ship deck metal surface treatment, and directly guide the industry's standard formulation and industry. Specification of

construction methods. China's application in this area is still very small, and only a few items have used the hook-type shot blasting machine process. In the waterproof coating of highways, municipal roads and concrete bridges, it is almost a blank[2].

At this stage, shot blasting technology is moving towards energy saving, environmental protection, high efficiency, safety and economy. Various types of cleaning machines have appeared in succession. In the technology development trend, new technologies are combined with computer technology to realize shot blasting machine. Intelligent and electronic.

3. Hook Type Shot Blasting Machine Principle

Hook type shot blasting machine refers to mechanically throwing the pellets onto the working surface at a high speed and a certain angle, causing the pellets to impact the working surface, and then cleaning the air inside the machine through the matching vacuum cleaner. The technique of separately recovering the pellets and the cleaned impurities and making the pellets reusable. The hook type shot blasting machine is equipped with a dust remover, which can achieve dust-free and pollution-free construction, which not only improves efficiency but also protects the environment.

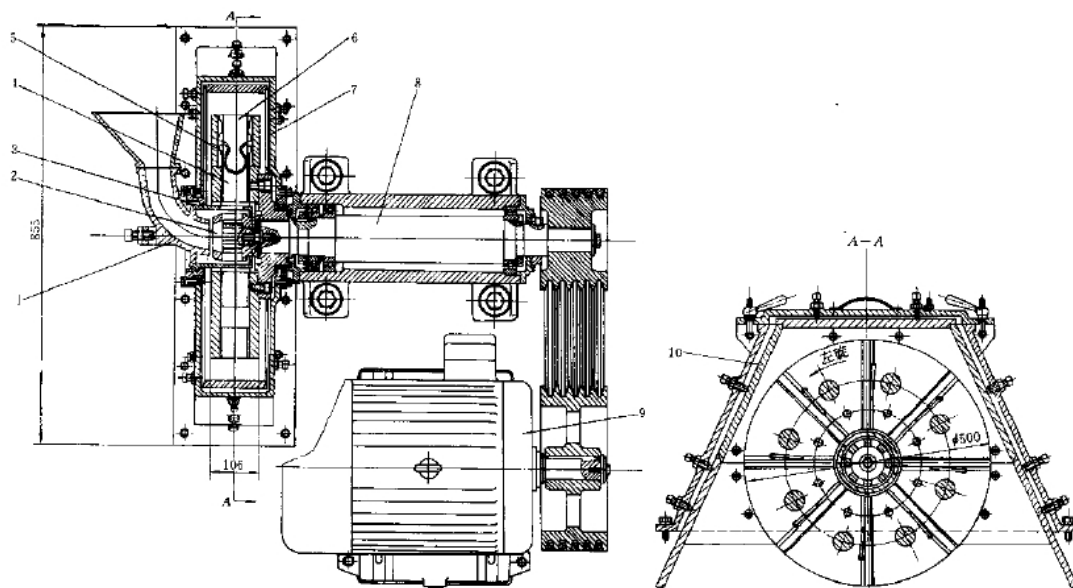


Figure 1. blasting machine

1-injection pail 2-separate pill wheel 3-directional sleeve 4-blade 5-spring card
6-impeller 7-shell 8-spindle 9-motor 10-guard

The hook type shot blasting machine can be divided into three types according to its walking form: hand push type, vehicle type and self type. By operating and controlling the particle size and shape of the pellets, and adjusting and setting the walking speed of the machine, the hook-type shot blasting machine controls the ejection flow of the pellets to obtain different ejection strengths and obtain different surface treatment effects[3].

The hook type shot blasting machine processing technology and the hook type shot blasting machine processing device control the processed surface condition by three parameters according to the difference of the surface to be processed. Select the size and shape of the pellets; the walking speed of the equipment; the flow rate of the pellets. The above three parameters cooperate with each other to obtain different treatment effects, and to ensure the ideal roughness of the surface after treatment by the hook type shot blasting machine[4].

4. Organization of the Text

4.1 Design of Hook Type Shot Blasting Machine

4.1.1 Main Components and Functions of Hook Type Shot Blasting Machine

The structure of the equipment consists of a cleaning room, a gate, a track, a hook, a lifting system, a pilling system, a screw conveying system, a wind separation and a cyclone separation system, a shot blasting system, a dust removal system, and an electrical system. The main components are described as follows:

(1) Cleaning room

The cleaning room is the main working area of the whole set of equipment, using electric welding structure. In order to enable the steel shot thrown by the blasting machine to be effectively thrown onto the surface of the workpiece to be cleaned, the side of the blasting machine is designed to be inclined at an angle; in the indoor blasting machine The part of the steel shot that is thrown out is specially protected by a special material, and the other parts are protected by rubber to protect the chamber wall from being damaged by the steel shot[5].

(2) Gate

The two doors are opened outside to increase the indoor cleaning volume. For safety reasons, a limit switch is installed above the gate, and the blasting machine must be started after the door is closed.

(3) Tracks and hooks

The machine adopts a compact hook, which can not only realize the entry and exit of the workpiece into the cleaning chamber, but also ensure that the workpiece rotates 360 degrees in the room, both forward and reverse, so that the workpiece can be cleaned at all angles.

(4) hoist

This machine adopts a flat belt driven bucket elevator. The blanking form adopts centrifugal gravity type falling pellets. When the steel pellets are lifted, the steel pellets and dust are quickly separated under the action of the fan, and the dust is sucked away by the fan. The pellets enter the slide tube by their own weight under the action of centrifugal force. Compared with other equipment, it has a small footprint in the vertical conveying of materials; the same lifting height is short, the conveying route is short; the system layout is compact; working in the closed casing, it has better sealing performance and avoids environmental pollution[6].

(5) Separator

This machine adopts two kinds of structures: flow curtain type wind separation and cyclone separation. When the steel shot is separated from the slide pipe of the hoist into the flow curtain type, the steel shot is conveyed into a strip shape by spiral, scattered underneath. On the two-stage flow screen, after passing the collision of two flow screens. Freely falling into the storage tank below, at the same time, after the above flow, the mixture of the sand and sand conveyed by the hoist forms a 20mm thickness pill sand curtain, in the wind separation separation zone, in the fan The horizontal airflow generated by the action continuously passes through the pill screen, forcing the steel pill to be quickly separated from the dust and the oxides that are shot down on the product, due to the proportion of steel pill and dust and the oxides that are shot down on the product. The difference is that after the airflow passes through the pill screen, it is slightly smaller than the major steel pill and falls into the storage tank below.

When the steel shot is free to fall into the storage tank below, the dust with a small specific gravity and the oxides and the crushed tiny metal particles on the product are quickly taken away by the airflow into the cyclone. Separation, forcing the coarse oxide particles that are shot down on the product, the coarse particles in the dust, the crushed tiny metal particles, settled at the bottom of the cyclone, and discharged from the waste pipe as waste through the bottom discharge hole, other Fine particles continue to enter the dust collector along the ventilation ducts.

(6) Screw conveyor

It is driven by a motor driven gear reducer to drive the screw joint, and the steel pill and other mixture falling from the cleaning chamber are transported to the bottom of the hoist. In order to prevent large debris from entering the screw conveyor and the hoist, a screen is arranged at the bottom of the cleaning chamber. Orifice plate. There are three types of screw conveyors: solid surface, belt type, and blade type. The solid surface type is used to transport dry, less viscous powdered and granulated materials. The belt type is used to transport bulk or medium viscosity materials. The blade type is used to transport materials with higher viscosity and is less used. Therefore, the design of this paper requires the selection of a physical surface.

(7) Shot blasting machine

The blasting machine is mainly composed of main components such as pill tube, impeller, blade, splitting wheel, directional sleeve, linkage plate, bearing seat, main shaft, motor, shroud and protective plate. The splitting wheel is fixed on the main shaft and rotates together with the blade, and the directional sleeve is fixed on the body of the blasting machine. Rotating the directional sleeve can change the throwing direction of the steel shot, the angle of the orientation window, and determine the radial scattering angle of the projectile, which is generally about 60 °C. The steel shot belt is olive-shaped.

A single row of radial rolling bearings is mounted on the impeller shaft, and the bearing housing is supported by anti-vibration rubber, which can reduce the vibration caused by the imbalance of the impeller, thereby improving the service life of the bearing[7].

(8) Dust removal system

The dust removal system consists of a cloth bag, a vibrating bag mechanism, a body, a dust collecting bucket, a return air duct, and a dust removing fan.

4.1.2 Working Principle and Process

The hook type shot blasting machine removes rust layer, scale, strengthening and finishing treatment on the surface of the workpiece. The machine adopts a hook hanging carrying mode. In the shot blasting cleaning chamber, the workpiece is driven by the spreader, and the projectile is arranged to be sprayed and cleaned on the upper and lower side of the blasting machine, which can be set according to the size of the workpiece. The number of workpieces hung by a hook is high in production efficiency[8].

Shot blasting machine processing: firstly, the workpiece is hung on the hook through the spreader outside the cleaning room. The hook moves along the track with the workpiece into the shot blasting room, then the door is closed, the dust removal system, the blasting machine, the feeding system When it is turned on, the spreader drives the workpiece to rotate, and at the same time, it receives the shot blasting of the workpiece by the side blasting machine. The impeller rotating at high speed in the blasting machine uniformly throws the steel shot onto the surface of the workpiece to remove the rust layer and scale. The projectile projectile is sent to the hoist through a screw conveyor. After passing through the air separation separator, the separator separates the dust and fine particles in the projectile. The clean projectiles are sent to the blasting machine respectively, and after being accelerated by the blasting machine, they are ejected onto the surface of the workpiece, and are sequentially circulated until the workpiece is cleaned up [9].

4.1.3 Scope of Application

This type of cleaning machine is suitable for surface cleaning or strengthening treatment of medium and small castings and forgings in the casting, construction, chemical, motor, machine tool and other industries. It is especially suitable for surface cleaning and shot peening of castings, forgings, aluminum alloy castings and steel structural parts of various varieties and small batches to remove a small amount of sand, sand core and oxide scale on the surface of the workpiece; it is also suitable for

heat treatment parts. Surface cleaning and strengthening; especially suitable for the cleaning of slender, thin-walled parts that are not suitable for collision.

5. Conclusion

By referring to the existing products and materials, the implementation of the components can basically meet the requirements of the required motion form, motion law, functional range, etc., and the structure is simple. The design and the partial data of the existing products are referenced in this design. The design process begins with the blasting machine, followed by the selection of the bucket elevator and the screw conveyor. The scope of blasting machine used in China is still not very wide, and the manufacturing technology is still relatively backward compared with foreign countries. Such as the wear resistance of the blasting machine blade, noise rate, service life and so on. I hope that I can get a general understanding of the blasting machine knowledge through this design, and lay a certain foundation for the future entry into the blasting machine manufacturing field.

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