

HIGH-SECURITY SEAL DISPENSING MACHINE

Technical Field

The present invention relates to the field of seal dispensing machines, specifically a high-security seal dispensing machine.

Background Technology

The logistics industry in China has made great strides alongside the rapid growth of the national economy and the vigorous development of foreign trade. The development of container transportation by roads, waterways, and inland rivers has opened up new prospects for container transport. In the transportation and use of containers, traditional methods involve using mechanical seals specifically designed for containers. Before shipping, seals are mechanically applied to containers. Upon arrival at destinations, the intactness of the seals is inspected to determine if contents of containers have been tampered with during transit. If issues arise, shippers can hold carriers responsible based on conditions of seals. Currently, domestic container terminals primarily rely on manual methods. Container seal entry, inventory, distribution, allocation, and tracking are mainly carried out through operations of shipping companies, their agents, fleets, and drivers.

However, an overview of the application of container seal distribution systems at domestic and foreign ports reveals that logistics distribution centers at foreign ports tend to favor highly automated seal distribution machinery. Automated distribution machinery has become an indispensable part of logistics centers, distribution centers, or circulation centers in developed countries. Therefore, comprehensive optimization of the current seal distribution methods and the development of a more mechanized, automated, and intelligent seal distributor have become the key breakthrough and research focus of current port technology and development trends. Manual methods present significant drawbacks in practical work processes, including complexity in operation, high communication costs, delayed information dissemination, traffic congestion, low work efficiency, high error rates, and ineffective safety measures. Furthermore, due to authorization requirements from various large shipping companies, many ports use seals of

disparate shapes and sizes, leading to inefficient seal distribution, which has caused great inconvenience in managing seal storage, distribution, and seal data statistics.

Therefore, technical personnel in this field have provided a high-security seal distribution machine to address the issues raised in the background technology.

Summary of the Invention

I. Technical problems to be solved

In view of shortcomings of existing technology, the present invention provides a high-security seal distribution machine, which utilizes the Internet of Things (IoT) as a technical background to systematically measure seals from various large ship companies first, design effective seal storage channel dimensions, and apply precision mechanical processing, thereby achieving efficient distribution of seals, and resolving issues related to varying sizes of container seals, inconvenient storage management, and low efficiency in seal loading and distribution, therefore, when it needs to collect seals for loading empty containers, drivers generate QR codes or barcodes for seal retrieval by using a mobile app, or print barcodes or QR codes on papers, scanning devices on cabinets are used for recognition and scanning, after gates recognize license plates, gate systems validate the data and then issue distribution instructions through the network, then seal machine control systems obtain cabinet ownership information of seals' QR codes, send push commands to seal distribution machine processing centers, and drive linkage push devices of automated mechanical equipment to push corresponding number of seals to machines 'delivery ports; and drivers then collect the seals while real-time feedback data information is sent to seal machine management systems. Throughout this process, machine screens also display real-time seal retrieval operation information, ensuring the timeliness and accuracy of seal retrieval while reducing human intervention, simplifying information transmission, and significantly improving the efficiency of seal management at docks.

II. Technical solutions

In order to achieve above purposes, the present invention provides following technical solutions: a high-security seal dispensing machine comprises a main box, wherein an outer wall at a front end portion of the main box is provided with a first switch door, an outer wall on one side of the main box is provided with an air conditioning position, front end portions of an outer wall on one side of the air conditioning position are provided with two auxiliary mounting plates, rear end portions of an outer wall on one side of the air conditioning position are provided with mounting holes, an upper end portion of the main box is provided with a top plate, a rear end portion of one side of an outer wall of the main box is provided with a display screen, end portions of an outer wall of the main box away from the display screen are respectively provided with an auxiliary screen, a scanner, a pickup port and a control interface, an outer wall of a rear end portion of the main box is provided with a third switch door, a bottom surface inside the main box is provided with a power box, inner walls of the main box are provided with OCR (Optical Character Recognition) support frames, and lower end portions of the OCR support frames are provided with servo motors.

The above technical solutions have significantly improved the efficiency of seal loading and distribution as well as dock business management through unified seal management, thereby reducing work duration and simplifying task processes. Each seal corresponds to specific QR code information, which ensures data accuracy while minimizing human intervention and simplifying information transmission and greatly saves labor and resources, while ensuring the safe and standardized retrieval of seals, facilitating drivers access to the seals and guaranteeing equipment and personal safety; further the above technical solutions include designs of channels, front-end ramps, lifting systems, lateral movement mechanisms, receiving flaps, rear door loading configurations, and safety island adaptation for gate use, thereby enhancing cooperation between devices.

Preferably, a lower surface of the main box is provided with a plurality of fixing frames.

Through the above technical solutions, the stability is strengthened by setting the plurality of fixing frames.

Preferably, on one side of an outer wall of a front end portion of the first switch door are provided two first locks.

Through the above technical solutions, cooperation between devices is improved by providing the two first locks.

Preferably, a middle portion of an outer wall of a front end portion of the first switch door is provided at least one first handle.

Through the above technical solutions, it is easy to grasp by setting the at least one first handle.

Preferably, middle portions of an outer wall on one side of the air conditioning position are provided mounting slots.

Through the above technical solutions, the mounting slots are provided for easy grasping

Preferably, inner walls of the main box are provided with reinforcement frames.

Through the above technical solutions, the stability is improved by setting the reinforcement frames

Preferably, outer walls on both sides of the OCR support frames are provided with first conveyor belts.

Through the above technical solutions, cooperation between devices is improved by providing the first conveyor belts.

Preferably, outer walls of front end portions of the OCR support frames are provided with a plurality of belt conveyor cargo lanes.

Through the above technical solutions, there are several belt conveyor cargo lanes arranged.

Work principle: when the high-security seal dispensing machine is needed for use, the Internet of Things (IoT) is used as a technical background to first systematically measure seals of large ships of various sizes, design effective seal storage channels, and apply precision mechanical processing techniques, which achieves the push distribution of seals, and effectively solves problems of container seals of different sizes, inconvenient storage and management, and low seal filling and distribution efficiency; when drivers need to obtain seals for loading empty containers, the present invention generates QR codes or barcodes through a mobile app, which are then scanned by a scanner on a machine cabinet, a seal control system obtains corresponding information from a seal's QR code, then sends a distribution command to a seal dispensing machine processing center, driving automated mechanical equipment to push out a required quantity of seals at a machine's delivery port. The process ensures the timeliness and accuracy of seal retrieval, reduces manual intervention, simplifies information transmission, and significantly enhances efficiency of seal management at docks; through unified management of seals, the efficiency of seal loading and distribution is greatly improved, work duration is reduced, tasks are simplified, and seals corresponding to two-dimensional code information one by one ensure the accuracy of information; the entire process minimizes human intervention, simplifies information transmission, and saves manpower and resources, while also ensuring the safety and convenience of seal retrieval for drivers and guaranteeing equipment and personal safety; further by utilizing designs such as aisle and front ramp design, lifting design, lateral movement design, cargo flip design, rear door loading design, and suitable gate island safety design, cooperation between the devices is enhanced; and administrators just transport seals to a fully automatic seal dispensing machine on-site, when a container trailer get a task of picking up empty containers, the driver thereof drives to a designated fully automatic seal dispensing machine, uses the mobile

app to generate a QR code for extracting the seals or the barcode or QR code printed on a paper document, and uses the scanner on the cabinet to identify and scan, the scan results are fed back to the seal machine management system, which, based on the feedback information, searches for the corresponding operation document, drives the devices to dispense an appropriate number of seals at the machine's delivery port, and prompts the driver to retrieve the seals based on successful verification on the machine screen.

III. Beneficial effects

The high-security seal dispensing machine provided in the present invention has following beneficial effects:

1. The present invention provides a high-security seal distribution machine. Compared to existing high-security seal distribution machines, the present invention, utilizes the Internet of Things (IoT) as a technical background to systematically measure seals from various large ship companies first, design effective seal storage channel dimensions, and apply precision mechanical processing, thereby achieving efficient distribution of seals, and resolving issues related to varying sizes of container seals, inconvenient storage management, and low efficiency in seal loading and distribution. When it needs to collect seals for loading empty containers, drivers generate QR codes or barcodes for seal retrieval by using a mobile app, or print barcodes or QR codes on papers, scanning devices on cabinets are used for recognition and scanning, so that the seal machine control systems obtain cabinet ownership information of seals' QR codes, send push commands to seal distribution machine processing centers, and drive linkage push devices of automated mechanical equipment to push corresponding number of seals to machines 'delivery ports; and drivers then collect the seals while real-time feedback data information is sent to seal machine management systems. Throughout this process, machine screens also display real-time seal retrieval operation information, ensuring the timeliness and accuracy of seal retrieval while reducing human intervention, simplifying information transmission, and significantly improving the efficiency of seal management at docks.

2. The present invention provides a high-security seal distribution machine. Compared to existing high-security seal distribution machines, the present invention greatly enhances the efficiency of seal loading and distribution as well as dock business management through unified seal management, thereby reducing work duration and simplifying task processes. Each seal corresponds to specific QR code information, which ensures data accuracy while minimizing human intervention and simplifying information transmission and greatly saves labor and resources, while ensuring the safe and standardized retrieval of seals, facilitating drivers access to the seals and guaranteeing equipment and personal safety; further, the present invention includes designs of channels, front-end ramps, lifting systems, lateral movement mechanisms, receiving flaps, rear door loading configurations, and safety island adaptation for gate use, thereby enhancing cooperation between devices.

3. The present invention provides a high-security seal distribution machine. Compared to existing high-security seal distribution machines, the present invention features a simple structure, easy usage, and strong practicality. Through designs of channels, front-end ramps, lifting systems, lateral movement mechanisms, receiving flaps, rear door loading configurations, and safety island adaptation for gate use, the present invention enhances the cooperation between devices. When it needs to collect seals for loading empty containers, drivers generate QR codes or barcodes for seal retrieval by using a mobile app, or print barcodes or QR codes on papers, scanning devices on cabinets are used for recognition and scanning, so that the seal machine control systems obtain cabinet ownership information of seals' QR codes, send push commands to seal distribution machine processing centers, and drive linkage push devices of automated mechanical equipment to push corresponding number of seals to machines 'delivery ports; and drivers then collect the seals while real-time feedback data information is sent to seal machine management systems. Throughout this process, machine screens also display real-time seal retrieval operation information, ensuring the timeliness and accuracy of seal retrieval while reducing human intervention, simplifying information transmission, and significantly improving the efficiency of seal management at docks.

Brief Description of the Drawings

Figure 1 is an isometric view of a high-security seal dispensing machine proposed by the present invention;

Figure 2 is an isometric exploded view of a high-security seal dispensing machine proposed by the present invention;

Figure 3 is a front view of a high-security seal dispensing machine proposed by the present invention;

Figure 4 is an enlarged view of part “A” in Figure 2;

Figure 5 is an enlarged view of part “B” in Figure 2; and

Figure 6 is an enlarged view of part “C” in Figure 2.

The markups in the drawings are indicated as follows:

1-main box;

2-fixing frame;

3-first switch door;

4-first lock;

5-first handle;

6-air conditioning position;

7-auxiliary mounting plate;

8-mounting slot;

9-mounting hole;

10-top plate;

11-display screen;

12-auxiliary screen;
13-scanner;

14-pickup port;

15-control interface;

16-third switch door;

17-reinforcement frame;

18-power box;

19-OCR support frame;

20-servo motor;

21-first conveyor belt; and

22-belt conveyor cargo lane.

Specific Embodiments

The technical solutions in the embodiments of the present invention will be clearly and completely described below with reference to the accompanying drawings in the embodiments of the present invention. Obviously, the described embodiments are only some of the embodiments of the present invention, not all of them. Based on the embodiments of the present invention, all other embodiments obtained by those of ordinary skill in the art without creative efforts shall fall within the scope of protection of the present invention.

Embodiment 1

As shown in figures 1-5, an embodiment of the present invention provides a high-security seal dispensing machine, comprising a main box 1, wherein an outer wall at a front end portion of the main box 1 is provided with a first switch door 3, an outer wall on one side of the main box 1 is provided with an air conditioning position 6, front end portions of an outer wall on one side of the air conditioning position 6 are provided with two auxiliary mounting plates 7, rear end

portions of an outer wall on one side of the air conditioning position 6 are provided with mounting holes 9, an upper end portion of the main box 1 is provided with a top plate 10, a rear end portion of one side of an outer wall of the main box 1 is provided with a display screen 11, end portions of an outer wall of the main box 1 away from the display screen 11 are respectively provided with an auxiliary screen 12, a scanner 13, a pickup port 14 and a control interface 15, an outer wall of a rear end portion of the main box 1 is provided with a third switch door 16, a bottom surface inside the main box 1 is provided with a power box 18, inner walls of the main box 1 are provided with OCR support frames 19, and lower end portions of the OCR support frames 19 are provided with servo motors 20.

the present invention utilizes the Internet of Things (IoT) as a technical background to systematically measure seals from various large ship companies first, design effective seal storage channel dimensions, and apply precision mechanical processing, thereby achieving efficient distribution of seals, and resolving issues related to varying sizes of container seals, inconvenient storage management, and low efficiency in seal loading and distribution. When it needs to collect seals for loading empty containers, drivers generate QR codes or barcodes for seal retrieval by using a mobile app, or print barcodes or QR codes on papers, scanning devices on cabinets are used for recognition and scanning, so that the seal machine control systems obtain cabinet ownership information of seals' QR codes, send push commands to seal distribution machine processing centers, and drive linkage push devices of automated mechanical equipment to push corresponding number of seals to machines 'delivery ports; and drivers then collect the seals while real-time feedback data information is sent to seal machine management systems. Throughout this process, machine screens also display real-time seal retrieval operation information, ensuring a one-to-one correspondence and the timeliness and accuracy of seal retrieval while reducing human intervention, simplifying information transmission, and significantly improving the efficiency of seal management at docks.

A lower surface of the main box 1 is provided with a plurality of fixing frames 2, and the stability is strengthened by setting the plurality of fixing frames 2; on one side of an outer wall of

a front end portion of the first switch door 3 are provided two first locks 4, and the cooperation between devices is improved by providing the two first locks 4; a middle portion of an outer wall of a front end portion of the first switch door 3 is provided at least one first handle 5 and it is easy to grasp by setting the at least one first handle 5; middle portions of an outer wall on one side of the air conditioning position 6 are provided mounting slots 8, and the mounting slots 8 are provided for easy grasping; inner walls of the main box 1 are provided with reinforcement frames 17, and the stability is improved by setting the reinforcement frames 17; outer walls on both sides of the OCR support frames 19 are provided with first conveyor belts 27, and the cooperation between devices is improved by providing the first conveyor belts 27; outer walls of front end portions of the OCR support frames 19 are provided with a plurality of belt conveyor cargo lanes 22, and the plurality of belt conveyor cargo lanes are provided.

Although embodiments of the present invention have been shown and described, it is understandable to a person of ordinary skill in the art that these embodiments may be varied, modified, replaced, and modified in a variety of ways without deviating from the principle and spirit of the present invention, and that the protection scope of the present invention is limited by the attached claims and their equivalents.

Claims

1. A high-security seal dispensing machine, comprising a main box (1), wherein an outer wall at a front end portion of the main box (1) is provided with a first switch door (3), an outer wall on one side of the main box (1) is provided with an air conditioning position (6), front end portions of an outer wall on one side of the air conditioning position (6) are provided with two auxiliary mounting plates (7), rear end portions of an outer wall on one side of the air conditioning position (6) are provided with mounting holes (9), an upper end portion of the main box (1) is provided with a top plate (10), a rear end portion of one side of an outer wall of the main box (1) is provided with a display screen (11), end portions of an outer wall of the main box (1) away from the display screen (11) are respectively provided with an auxiliary screen (12), a scanner (13), a pickup port (14) and a control interface (15), an outer wall of a rear end portion of the main box (1) is provided with a third switch door (16), a bottom surface inside the main box (1) is provided with a power box (18), inner walls of the main box (1) are provided with OCR support frames (19), and lower end portions of the OCR support frames (19) are provided with servo motors (20).
2. The high-security seal dispensing machine according to claim 1, wherein at a lower surface of the main box (1) are provided a plurality of fixing frames (2).
3. The high-security seal dispensing machine according to claim 1, wherein on one side of an outer wall of a front end portion of the first switch door (3) are provided two first locks. (4)
4. The high-security seal dispensing machine according to claim 1, wherein a middle portion of an outer wall of a front end portion of the first switch door (3) is provided at least one first handle (5).
5. The high-security seal dispensing machine according to claim 1, wherein middle portions of an outer wall on one side of the air conditioning position are provided mounting slots (8).

6. The high-security seal dispensing machine according to claim 1, wherein inner walls of the main box (1) are provided with reinforcement frames (17).
7. The high-security seal dispensing machine according to any one of claims 1, wherein outer walls on both sides of the OCR support frames (19) are provided with first conveyor belts (21).
8. The high-security seal dispensing machine according to any one of claims 1, wherein outer walls of front end portions of the OCR support frames (19) are provided with a plurality of belt conveyor cargo lanes (22).