

Analysis of a Novel Automated Positioning Device

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Abstract. As a matter of fact, with the development of science and technology and the advancement of industrialization, automation equipment is more and more widely used in all walks of life, which deep into every link of the production line. With this in mind, whether it is automated manufacturing equipment or home and office automation equipment, they are greatly improving the productivity and quality of life. However, many existing automation equipment still face some challenges in practical applications. On this basis, this study proposed a novel automated positioning devices in order to solve certain limitation issues. To be specific, the innovation analysis and facility fabrication are demonstrated. According to the analysis, it is believed that the new designs will have better ability as well as performance. The possible improvements are also claimed and the further ability enhancements are also evaluated. Overall, these results shed light on guiding further exploration of automated positioning device.

Keywords: List the, keywords covered, in ythe paper.

1. Introduction

Large complete sets of equipment in automation systems, also known as automation devices. It refers to the process of automatic operation or control of a machine or device according to prescribed procedures or instructions without human intervention [1-3]. Therefore, automation is an important condition and a significant symbol of the modernization of industry, agriculture, national defense and science and technology [4]. With the development of science and technology and the advancement of industrialization, automation equipment is more and more widely used in all walks of life, deep into every link of the production line. Whether it is automated manufacturing equipment or home and office automation equipment, they are greatly improving the productivity and quality of life. However, many existing automation equipment still face some challenges in practical applications [5, 6].

First of all, the positioning accuracy of many automations' equipment is not high enough, which may affect the performance and efficiency of the equipment in some application scenarios that require precise positioning, such as microelectronics manufacturing, machine vision, etc. In addition, some devices also face difficulties in positioning in complex environments, such as positioning and path planning in multi-object and changing environments. Secondly, the operation of many automations' equipment is complex and requires professional training and experience. This not only increases the threshold for the use of equipment, but also limits the popularity and application of automation equipment. For non-professional users, simple and easy-to-use operation interface and intelligent control are important considerations for them to choose automation equipment.

In order to solve the above problems, this article will introduce a new type of automatic positioning device. The device is exquisitely designed, powerful and easy to operate, which can meet the needs of various complex environments and application scenarios. By introducing a variety of innovative design and technologies, the device can achieve high-precision positioning and have a good user experience. It is believed that this automated positioning device will have broad application prospects in the automation equipment market.

2. Description of the Device

The automatic positioning device is a multi-functional, high-precision device that combines mechanical, electronic and computer technology to achieve accurate movement and positioning in all directions. The following is a detailed description of each module of the device:

- **Positioning pulls rod module:** This is a core module, and its main function is to accurately locate. It includes positioning rods, positioning rod peripherals, and elastic switch buttons set in all positions of positioning rods. By operating these switch buttons, you can control the movement and positioning of the device in the front and back, left and right, up and down directions. The positioning pull rod peripheral mechanism is fixedly connected with an interface module for connecting with other modules or devices.

- **Fixed column module:** This module includes the lower column, the middle column and the upper column. The lower column is used to fix the equipment. The middle column and the upper column can be moved back and forth and up and down. The right end of the positioning rod peripheral mechanism is fixedly connected to the top of the upper column to achieve the stability and positioning of the equipment.

- **Left and right walking module:** This module includes left and right transmission mechanism and left and right moving support platform. The left and right mobile support platform is set at the bottom of the positioning rod module, the left end is connected to the positioning rod peripheral mechanism, and the right end is connected to the left and right transmission mechanism. By operating this module, the left and right movement of the device can be realized.

- **Up and down walking module:** This module includes the up and down transmission mechanism and the up and down moving support platform. The up and down mobile support platform is set at the bottom of the left and right mobile support platform, and the up and down transmission mechanism is set up on the up and down mobile support platform. By operating this module, the up and down movement of the device can be realized.

- **Front and rear walking module:** This module includes front and rear mobile support platform, front and rear transmission mechanism and front and rear module fixed seats. By operating this module, the front and rear movement of the equipment can be realized.

These modules have their own specific functions and can work together to achieve precise positioning control. Among them, the positioning rod module uses a variety of elastic switch buttons, so that the device can be positioned in the front and back, left and right, upper and lower positions. The walking module uses left and right, up and down, front and rear transmission mechanisms, so that the device can walk left and right, up and down, back and forth. This design enables accurate control of the equipment according to actual needs during operation, which greatly improves the flexibility and efficiency of the equipment.

3. Innovative Analysis

Among many automations' equipment, the automated positioning device reflects a number of innovations to deal with some common technical problems. The following is a further explanation of the invention in combination with the implementation examples. The present invention is an automatic positioning device, as shown in Fig. 1.

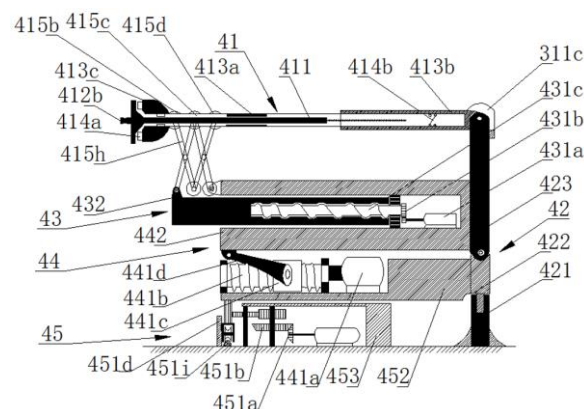


Figure 1. The longitudinal profile view of an automatic positioning device (interface module includes transmission drum module) for the invention;

The positioning rod module 41 includes the positioning rod 411, the positioning rod peripheral mechanism connected with the positioning rod movable socket, and the front, back, left, right and down elastic switch buttons set in the front, back, left, right and lower and lower positions of the positioning rod respectively. The positioning rod peripheral mechanism is fixedly connected with an interface module. Fixed column module 42, the fixed column module 42 includes the lower column 421 for bottom fixing, the middle column 422 connected with the upper end of the lower column 421 with a rotating shaft and can be moved back and forth, and the upper column 423 connected to the upper end of the middle column 422 through bolts and can be moved up and down. The left and right walking module 43 includes the left and right transmission mechanism and the left and right mobile support platform 432. The left and right mobile support platform 432 is set under the positioning rod module 41. The left end is connected to the positioning rod peripheral mechanism, and the right end is connected to the left and right transmission mechanism. The upper and lower walking module 44 includes the upper and lower transmission mechanism and the upper and lower moving support platform 442. The upper and lower moving support platform 442 is set below the left and right mobile support platform 432, the left and right transmission mechanism is set on the upper and lower moving support platform 442, and the left of the upper and lower moving support platform 442 The lower part is connected to the upper and lower transmission mechanism, and the right side is fixed on the upper column 423. The front and rear walking module 45 includes the front and rear mobile support platform 452, the front and rear transmission mechanism, and the front and rear module fixed seat 453. The upper and lower transmission mechanism is fixed on the front and rear mobile support platform 452. The lower left bottom of the front and rear mobile support platform 452 is connected to the front and rear transmission mechanism. As shown in Fig. 2 and Fig. 3, the front and rear transmission module includes the front and rear drive motor 451a, and the front and rear drive gear 451b, the fan-shaped gear plate 451c, the fan-shaped gear plate limit pin 451d, the front and rear drive motor 451a includes the output shaft, and the motor gear 451

The interface module also includes the transmission drum module. The transmission drum module includes the first section retractable drum middle shaft 415a, the first section retractable drum 415b, the first section retractable drum connection seat 415e, the second section retractable drum 415c, the second section retractable drum middle axis, the second section retractable drum. Preferably, the interface module also includes the walking module 31, the driving module 31 includes the transmission shaft gear 311a, the transmission shaft 311b, the transmission belt motor 311c, the retractable shaft connector 33, and the retractable shaft connector 33 includes the shaft coupling sleeve 312, the shaft connector positioning hole 313, and the shaft connector. Fixed pin 314, shaft connecting shaft head 315a, shaft connecting shaft head 315b, shaft connecting spring 316, shaft connecting outer rod 317, shaft connecting inner rod 318, the transmission belt motor 311c includes the output shaft and the motor gear fixed on the output shaft, the motor gear, transmission shaft gear 31 1a. The drum gear is a bevel gear. The rear side of the transmission shaft gear 311a at the right end of the transmission shaft 311b is meshed at a right angle with the motor gear, and the front side is meshed at a right angle with the drum gear at the corresponding position. The transmission belt motor 311c drives the motor gear, transmission shaft gear 311a, drum gear and fixed drum 415d in turn, so as to realize the left and right movement of the power exchange controller 2 on the fixed drum 415d. The retractable shaft connector 33 is set at the left end of the transmission shaft 311b. The shaft connector shaft head connecting rod 315b and the shaft connector outer rod 317 axial movable connection, radial stop connection, the shaft connector inner rod 318 is fixed connection with the shaft connector outer rod 317, the shaft connector shaft head 315a has.

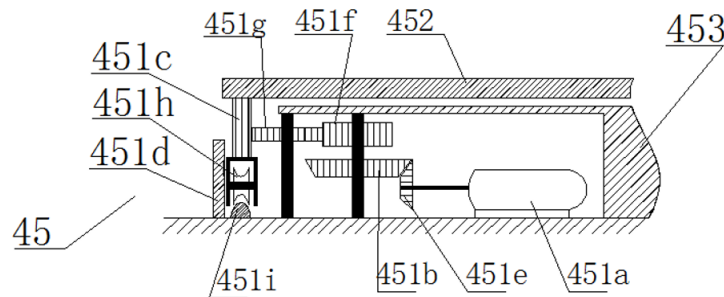


Figure 2. The local structure diagram of the front and rear transmission module of an automatic positioning device.

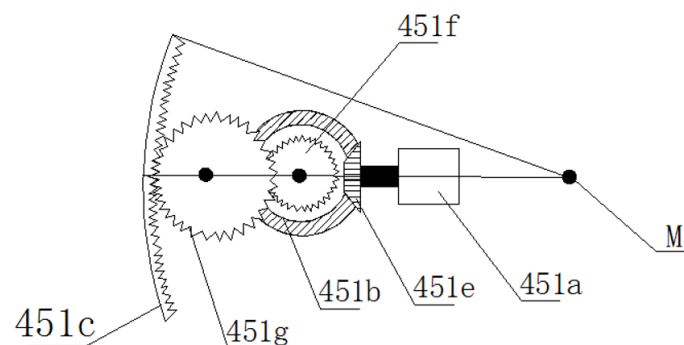


Figure 3. A schematic diagram of the principle of the front and rear transmission module of an automatic positioning device.

First of all, the device introduces a unique positioning rod module. Through the elastic switch button set on the positioning rod, the device can achieve precise positioning in the front and back, left and right, upper and lower positions. Compared with the traditional positioning device, this design greatly improves the positioning accuracy of the equipment, so that the equipment can cope with more complex operating requirements. Secondly, the device introduces left and right, up and down, front and back walking modules, so that the device can move in three-dimensional space. Compared with some devices that can only move in one or two directions, this design significantly enhances the mobility flexibility of the device, so that the device can work efficiently in a complex environment. Finally, the device also introduces a special interface module, so that the device can be effectively connected and controlled with other devices. This design not only enhances the practicality of the equipment, but also improves the compatibility and scalability of the equipment.

4. Practical and Market Potential Analysis

The automated positioning device has strong practicality and market potential due to its unique design and excellent performance. First of all, its practicality is mainly reflected in its powerful functions and excellent performance. It can accurately locate and move in all directions, which allows it to be applied in various scenarios that require precise positioning and movement, such as robot manufacturing, automated production lines, warehousing and logistics, etc. In addition, its interface module can effectively connect and control with other devices, which enhances the practicality of the device, so that the device can be applied in a wider range of environments and scenarios. Secondly, its market potential is mainly reflected in its broad application fields and good market prospects. Due to the more and more extensive applications of automation equipment in production and life, the demand for precise positioning and movement is also increasing. With its high-precision positioning and flexible mobility, the device can meet these needs and has great market potential. Finally, the device is exquisitely designed and easy to operate. Users can easily use it without professional training and experience, which greatly reduces the threshold for using the device and is conducive to the promotion and popularization of the equipment. In general, the automatic positioning device

combines the advantages of high precision, simple operation and wide application, and has great market prospects. It is expected it to play an important role in the future automation equipment market and promote the development of related industries.

5. Prospects and R&D Suggestions

From a global perspective, this automated positioning device is a new type of equipment produced through technological innovation under the general trend of automation and intelligence, combined with actual demand. However, whether for the equipment or the entire automation equipment market, one should clearly realize that technological innovation and market expansion is an endless process [7-10]. One should continue to pay attention to and study new technologies and market dynamics in the future development to maintain the competition. Specifically, this study gives following suggestions

- Deepen technology research and development: Through further technology research and development, improve the stability and adaptability of the equipment, so that it can be applied in a wider range of environments and scenarios. At the same time, one should also develop new functions and performance so that the equipment can meet more needs and improve the market competitiveness of the equipment.

- Expand market development: one should develop products suitable for different scenarios and needs according to market demand, such as developing special equipment for specific industries or tasks to meet different market needs. At the same time, one should also increase market publicity, improve brand awareness and expand market share.

- Strengthen user service: it is necessary to provide perfect after-sales service, solve users' problems in the process of using equipment, and improve user satisfaction. At the same time, one should also help users better understand and use the equipment and improve the utilization rate of equipment through training and other means.

- Focus on social responsibility: As technology innovators and market participants, one should pay attention to the social responsibility and contribute to the development of society through technological innovation and market development.

6. Conclusion

Contemporarily, with the increasing development of automation technology, it has been deeply integrated into all fields of the production and life. As a member of this field, this automated positioning device shows great potential and value with its unique design and excellent performance. With its high-precision positioning, three-dimensional mobility and good compatibility, it can be widely used in robot manufacturing, automated production lines, warehousing and logistics and other fields, meeting precise positioning and flexible movement under various complex environments and requirements. However, the development and promotion of any new technology is a complex process, and the automated positioning device is no exception. It is needed to continue to face and solve various technical problems in the future research and development process to improve the stability and adaptability of the equipment. At the same time, one should also deal with market competition, optimize product performance, improve cost performance, and improve user service, so as to stand out in the fierce market competition. In addition, one needs to improve the technical acceptance and usage rate of users and promote the promotion and application of equipment through effective publicity and training.

In general, the automatic positioning device combines the advantages of high accuracy, flexible operation and good compatibility, and has obvious technical advantages. In the future, it is hoped that through further technological innovation, the equipment will achieve greater success in the automation equipment market, promote the development of related industries, and bring greater value to the society.

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