Intelligent manufacturing of sanitary ceramics - Probe into dynamic mechanism of bottom mold extraction

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Abstract: Firstly, mention bottom and motivation mechanism in intelligent manufacturing sanitary ceramics society demand. Secondly, analysis extraction process, put forward the proposals mention bottom die extraction dynamic mechanism and measures for its implementation, again on the dynamic mechanism of the key position and function of the analysis shows that the introduced its structure, functions and features, its working principle. Finally, the feasibility and superiority of power mechanism are proved.

1. Introduction
In recent years, with the rapid development of science and technology, daily ceramic industry production technology development is also very fast, some traditional backward equipment and complex production process is being eliminated, replaced by intelligent, automated advanced equipment and simple process, connected compact equipment and production lines. Ceramic industry is a typical labor-intensive industry. With the development of economy and the rising labor cost, it has become the future development trend of daily ceramic industry to improve the production efficiency by improving the intelligence and automation of the production process [1,2]. Intelligent manufacturing production line, therefore, development of sanitary ceramics for ceramic production enterprises to provide more energy saving, environmental protection, more efficient intelligent machinery and equipment, reduce the labor intensity, reduce the production cost, improve work efficiency, increase productivity, save energy, is of great significance for China’s ceramic industry, but also brings huge economic benefits to the society. Extract the bottom die is sanitary ceramics indispensable part of intelligent manufacturing production line, after the completion of the grouting body, need to open mold, extract the bottom die, die, air basks in blank and die, the blank on the bottom plate after correction and the online body of drying, dry after entered into the follow-up process of vertical lathe, the whole process to improve the efficiency of the product, Reduce the waste of manpower, material resources and time, optimize the working environment of workers.

This equipment reduces labor cost, improves production efficiency, simple and convenient operation.
2. Process analysis of power mechanism for bottom die extraction

2.1 The traditional process
At present, there are many kinds of sanitary ceramics in China. The grouting workshop where the workers extract the bottom mold is a large drying room (mainly to provide convenience for the drying of the body). The temperature of the grouting workshop is 36°C, and the humidity is above 90%. According to each production line about 18 bodies, the length of about 18 meters, each time workers have to go back and forth on the line to extract the bottom mold, repeated operation.

2.2 Research on power mechanism technology of bottom mold extraction
According to the bottom mold extraction mechanism needs to be manually driven, we now optimize the bottom mold extraction mechanism to make it fully automated, through the servo motor drive to drive the pulley transmission power. According to the photoelectric switch control bottom mold extraction mechanism runs to the position of each mold car for positioning. Then the mold is opened.

This paper illustrates the operation process of the power mechanism of the bottom mold extraction by taking the conjoined toilet as an example. This equipment can realize integral size difference is not conjoined body sit implement complete open mold, the conjoined body sit implement of different shape its stand billet craft flow maintains unchanged. The process flow of product automation is shown in Figure 1.

Fig. 1 Power mechanism process flow chart of bottom mold extraction
The power mechanism of bottom mold extraction is composed of servo motor, transmission mechanism, synchronous belt and signal receiving. The servo motor is the driving part, the transmission mechanism and the synchronous belt are the operation mechanism of the whole bottom mold extraction equipment, and the signal reception is to determine whether the next programming process meets the requirements.

The specific process is as follows:
(1) Extract the bottom mold equipment as the initial position, start the servo motor, and the equipment runs.
(2) After receiving the signal, the bottom mold extraction mechanism carries out the extraction of the bottom mold until the end of the action.
(3) After the end, the servo motor starts again and runs to the next model car, which cycles in turn.
(4) The bottom mold extraction mechanism returns to the initial position after running the last
3. The structure of power mechanism of lifting bottom die

The power mechanism is composed of four main components, such as servo motor, transmission wheel, synchronous belt and proximity switch.

Fig. 2 Equipment assembly drawing

This set of power mechanism is installed on one side of the gantry frame of the bottom film extraction equipment according to the site situation.

Fig. 3 Motor and drive wheel matching structure drawing
4. Programming diagram

Fig. 4 Initial operation drawing of power mechanism

Fig. 5 Power mechanism second model car running diagram
5. Conclusion
Based on the results and discussions presented above, the conclusions are obtained as below:

(1) This equipment after production debugging can conform to the requirements of the production enterprises, to replace the artificial pushes the disadvantages of the operation, to humanized operation, only need to press a pneumatic button, improve the work efficiency of the workers and the waste and loss of blank is significantly reduced, liberated the human labor, did it fully automated bottom die.

(2) The process of taking out the bottom mold of a complete body only needs 8 seconds to complete. Take the bottom mold structure is stable, fast, sustainable and other characteristics, improve the qualified rate of products and production efficiency, so as to increase output, improve enterprise and company income.

(3) At the same time, it can meet the production needs of different types of jointed toilets, and it is suitable for the production and development requirements of enterprises, and has broad prospects for development. It has certain reference value and guiding significance for the design and development of other types of sanitary ceramics production line.

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