

## 发明项目展板英文图片内容(一)

CAI No. 01-1

**Invention:** Intelligent Quenching Furnace and Quenching Processes  
Key Technology and Application      智能淬火炉与淬火工艺关键技术及应用

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**Patent No.:** LU500921; 200705142735; 2021/09538; 2021/06544;  
ZL202010476761. X; ZL202010592984. 2; ZL202010333934. 2;  
ZL202021217192. 9; ZL202020638377. 0; ZL202020639840. 3;  
ZL202020187747. 3; ZL202021209083. 2; ZL202021142947. 3;  
ZL202021142976. X; ZL202020638386. X; ZL202020952216. 9;  
ZL202020198070. 3; ZL202020215157. 7; ZL202020215183. X;  
ZL202020187748. 8; ZL202021209081. 3

### Introduction:

1. The invention is aimed at the existing quenching process with high energy consumption and high pollution and other technical problems. The team developed a new environmentally friendly quenching process based on PAG quenching media. The performance of the specimen was tested through experiments (Figure 1), and compared with the existing process, energy consumption was reduced while performance was improved. Based on this technology, the team invented a deep learning-based method and control system for detecting defects in binder clip (Figure 2), which realizes the detection and recognition of defective images of binder clip. It has published 4 papers in journals in the field of materials engineering, declared several Chinese patents and international patents, and won 1 provincial award (Figure 3). The search report shows that the technology has strong novelty, creativity and industrial practicability.

2. Aiming at the existing quenching equipment structure is simple, the temperature control is not accurate and other problems. With the research and development of the new environmentally friendly quenching process as a guide combined with the actual production of quenching equipment needs, the development of intelligent quenching equipment (Figure 4). Constructed a dynamic model of the quenching furnace feeding equipment, developed the quenching furnace feeding system, and realized the orderly and dense rows of feeding. The automatic control process designed by the team improves the

productivity of the quenching equipment and reduces the work intensity of the operators. This shows that the invention has high technical, economic and social value.

3. Existing quenching equipment is mostly high power consumption, low intelligence components, in response to low carbon emission reduction, the results of this invention fits the current policy trend, while intelligent equipment can be promoted and applied to other mechanical parts manufacturing fields, such as powder metallurgy products. Therefore, intelligent quenching furnace and quenching process key technology has high application value, economic value and social value.

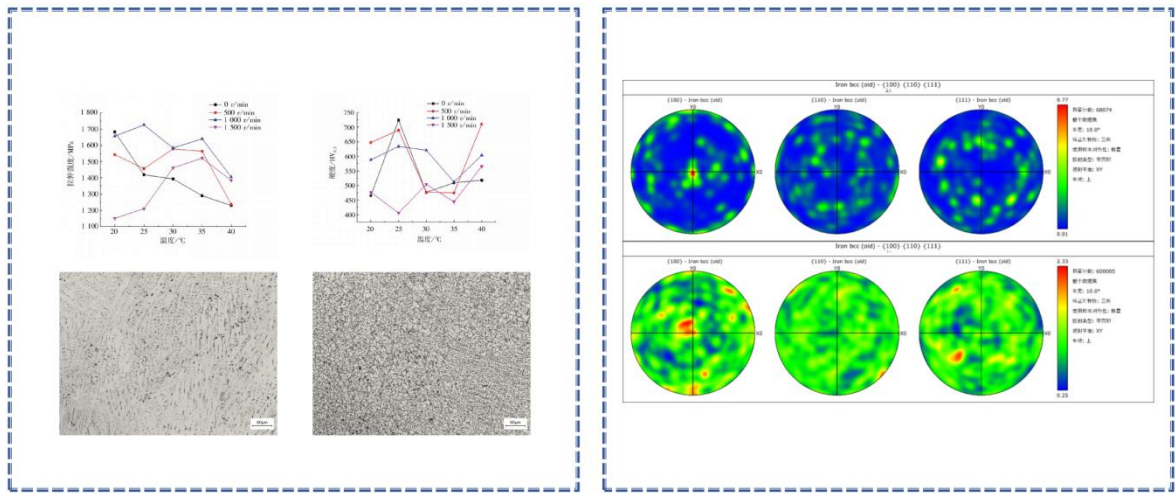


Fig.1 Microstructure Analysis and Property Comparison of Specimens Before and After Quenching

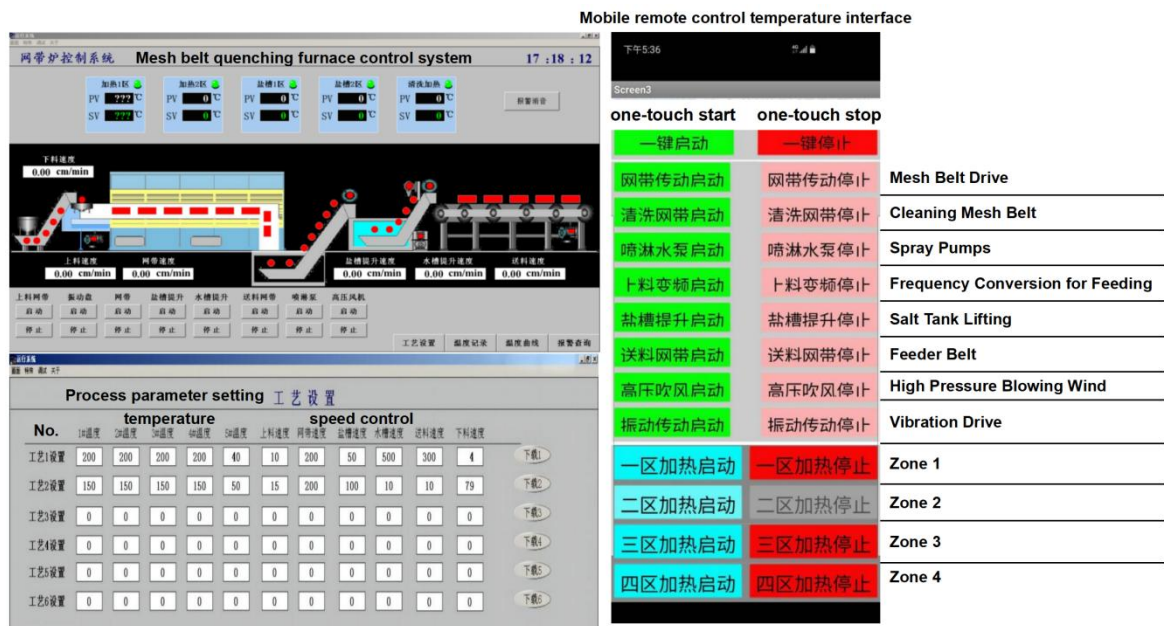


Fig.2 Control System Monitoring Display and Heating Control Display

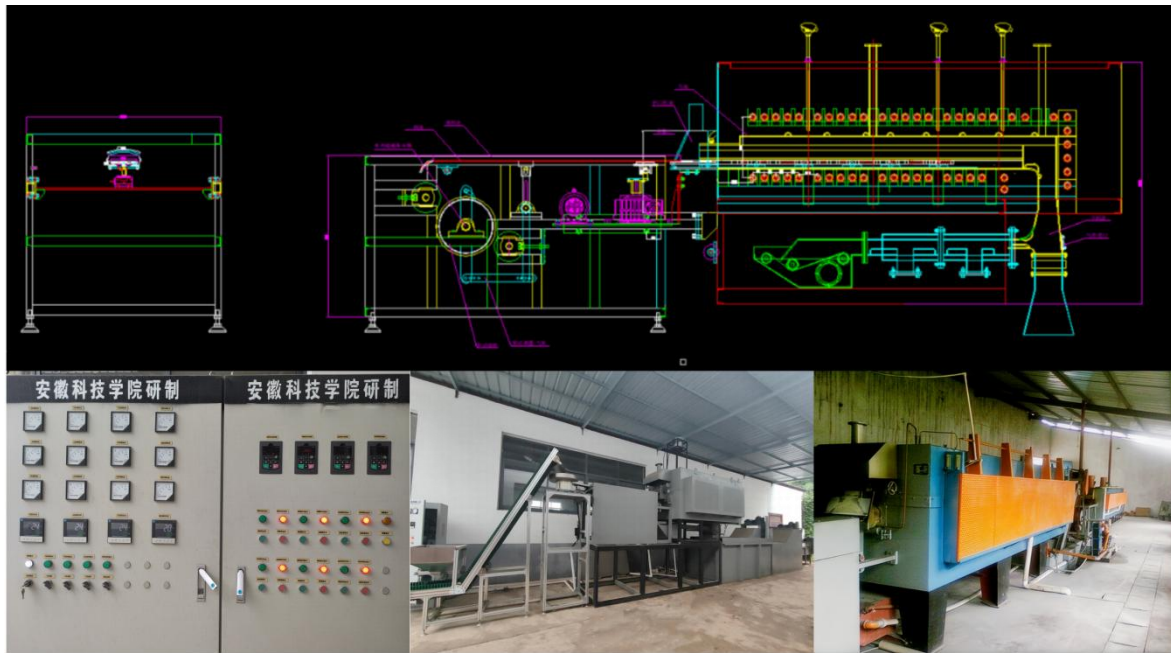


Fig.3 Quenching Equipment Two-dimensional Drawing and Actual Prototype Display





Fig.4 Invention Patents, Relevant Papers and Award Certificates Obtained for this Invention

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单位/公司介绍展板英文、图片内容（二）

CAI No. 01-2

Anhui Science and Technology University

Anhui Science and Technology University (AHSTU) is a provincial undergraduate institution with a long history, rich cultural heritage, and coordinated multi-disciplinary development. Currently, it hosts 21,000 full-time undergraduates and postgraduate students.

The university covers an area of over 2,600 mu (approximately 173 hectares). It currently operates 33 research platforms, including the National Crop Variety Regional Test Station in Fengyang County (Anhui Province), provincial-level key laboratories, provincial engineering research centers, and an international joint research center. The institution boasts 1 national-level off-campus practice education base for college students, 15 provincial-level demonstration experimental training centers, 1 provincial-level student labor education practice base, and 1 provincial-level innovation and entrepreneurship practice teaching center.

The Seed Science and Engineering program, designated as a national urgent-need talent program, is included in early admission enrollment. The university also conducts local special enrollment programs and targeted training programs for grassroots agricultural technology extension talents in Anhui Province.

Over the past five years, we have successively undertaken more than 2,900 scientific research projects at various levels. We have won more than 80 scientific research awards at or above the municipal and departmental levels, including one Second Prize of the National Natural Science Award and one Second Prize of the National Technological Invention Award.

The university has vigorously implemented the "Overseas (and across the Taiwan Strait) Cooperative School-running Project", carefully organized study abroad and overseas study programs for outstanding undergraduate students, and carried out education for international students pursuing professional master's degrees. We have established exchange and cooperation relationships with 26 universities in the United States, South Korea, the United Kingdom, Russia, and Taiwan region, etc.





Fig.1 Anhui Science and Technology University (LongHu)



Fig.2 Award Certificates (School Achievements)



Fig.3 Selected Scientific Research Achievements of the School



Fig.4 The project won the CAI Invention and Entrepreneurship Award



Fig.5 Photo of the R&D Team

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