附件3

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| 已申请山东省专利资助并获批的国外授权发明专利名单 |
| 序号 | 专利名称 | 专利号 |
| 1 | Stress gradient load testing apparatus and method for accurate determination of load energy | ZA202101722 |
| 2 | High-precision monitoring and early warning system and method for roof deformation | ZA202100041 |
| 3 | Filling mining method for fully-mechanized top coal caving working face | US11047236B2 |
| 4 | Wet concrete spraying single-particle aggregate rebound and adhesion mechanism testing platform | ZA202101259 |
| 5 | Absorption-induction convectional dust-controllingremoving airfog curtain device of fully-mechanized working face and method thereof | US11028693B2 |
| 6 | Grouting anchor bolt and grouting anchor cable for supporting of large deformation and constant resistance and quantitative roadway supporting method | US10975696B2 |
| 7 | Stress gradient loading test apparatus and method of accurately determining loading energy | US11041790B2 |
| 8 | 一种基于目标支撑压力的卸压钻孔间距离确定方法 | JP6821219 |
| 9 | Device and method for anchor bolt (cable) supporting structure test and anchoring system performance comprehensive experiment | US10969314 |
| 10 | Intelligent evacuation system and method used in subway station fire | ZA202001981 |
| 11 | Interference alarm identification method based on alarm duration feature | AU2019333948 |
| 12 | Coal measures fault formation simulation experiment device and normal and reverse fault simulation experiment method | US10991271B2 |
| 13 | Normal fault simulation experiment device with adjustable angle and fracture initiation position and method of using the same | US10957222B2 |
| 14 | 一种煤岩体分区注水渗流-损伤-应力耦合数值模拟方法 | RU2743121 |
| 15 | Composite high-absorbent anti-extinguishing gel for coal mines, preparation method and application | ZA202102601 |
| 16 | Multifunctional sustained-release microcapsule, preparation method and application thereo | ZA202102600 |
| 17 | Method of manufacturing piezoelectric thin film resonator on non-silicon substrate | US10979013B2 |
| 18 | Ground wellhole dedicated protective pipe for gas extraction of mining-induced area | US10883320B2 |
| 19 | Shearer cutting unit with double-speed rollers | US10954784B2 |