CLAIMS:

1. A crawling welding robot, characterized by comprising an adjustable magnetic adhesion module, wheel-tracked walking mechanisms, a crawler frame, and a welding load device, wherein the welding load device is disposed on the crawler frame;

   the wheel-tracked walking mechanisms is disposed at two opposite ends of the crawler frame for supplying power for crawling of the crawler frame; and

   the adjustable magnetic adhesion module is disposed on the crawler frame and disposed between two wheel-tracked walking mechanisms;

   wherein the adjustable magnetic adhesion module comprises a magnet module and a lifting adjustment module, and the lifting adjustment module is connected with the magnet module for controlling lifting and lowering of the magnet module; and

   the lifting adjustment module comprises a plurality of independently controllable lifting mechanisms, and an angle and/or a gap between the magnet module and a surface to be adhered is changed by separately adjusting the plurality of independently controlled lifting mechanisms.

2. The crawling welding robot according to claim 1, wherein each wheel-tracked walking mechanism comprises a magnetic base, a roller chain, a drive wheel, a driven wheel, and a first driving device;

   the first driving device is fixedly disposed on the crawler frame;

   both the drive wheel and the driven wheel are rotatably disposed on the crawler frame;

   the drive wheel and the driven wheel are connected by the roller chain; and

   the magnetic base is disposed on the roller chain.

3. The crawling welding robot according to claim 2, wherein the crawler frame is provided with a sliding slot;

   the driven wheel is slidably disposed in the sliding slot;

   the crawler frame is provided with a second driving device configured to drive the driven wheel to move in the sliding slot so that the corresponding roller chain is tensioned or slackened.

4. The crawling welding robot according to claim 3, wherein the crawler frame comprises an adjusting block and an adjusting screw, the adjusting block is slidably engaged with the sliding slot, the adjusting screw is screwed with the crawler frame, the adjusting screw is rotatably connected

with the adjusting block, and the adjusting screw is fixed relative to the adjusting block in an axial direction of the adjusting screw; when the adjusting screw is rotated, the adjusting block is slidable in the sliding slot; and the driven wheel is rotatably connected with the adjusting block.

5. The crawling welding robot according to claim 3, wherein the crawler frame comprises an adjusting block and an adjusting screw, the adjusting block is slidably engaged with the sliding slot, the adjusting screw is screwed with the crawler frame, and the adjusting screw is fixed to the crawler frame in an axial direction of the adjusting screw, and the adjusting screw is rotatably connected with the adjusting block; when the adjusting screw is rotated, the adjusting block is slidable in the sliding slot; and the driven wheel is rotatably connected with the adjusting block.

6. The crawling welding robot according to any one of claims 2 to 5, wherein the first driving device comprises a servo motor and a corner deceleration motor, the servo motor is connected with the corner deceleration motor, both the servo motor and the corner deceleration motor are fixed to the crawler frame, the drive wheel is fixed to a flange of the corner deceleration motor, and the drive wheel can be driven to rotate by the servo motor.

7. The crawling welding robot according to any one of claims 1 to 6, wherein the crawler frame comprises a vehicle body connection plate and two side plates which are connected with the vehicle body connection plate and are oppositely disposed, and the two wheel-tracked walking mechanisms are mounted to the two side plates, respectively.

8. The crawling welding robot according to any one of claims 1 to 7, wherein the welding load device comprises a weld holder and a welding gun linear oscillating mechanism;

the weld holder is fixedly disposed on the crawler frame;

the welding gun linear oscillating mechanism comprises a first linear motor, a first linear guide rail, a third driving device, a first transmission gear, and a first transmission rack;

the first linear motor is fixedly disposed on the weld holder, and the first linear guide rail is connected with the first linear motor; the first transmission gear is rotatably disposed on the first linear guide rail; the first transmission gear is meshed with the first transmission rack, and the first transmission rack is slidably engaged with the first linear guide rail; the third driving device is connected with the first transmission gear for driving the first transmission gear to rotate so as to drive the first transmission rack to reciprocally slide relative to the first linear guide rail.

9. The crawling welding robot according to claim 8, wherein the welding load device further comprises an angular oscillating and clamping mechanism for welding gun;

the angular oscillating and clamping mechanism for welding gun comprises an angular oscillator, a locking mechanism, and a clamp;

the angular oscillator is connected with the clamp for driving a welding gun disposed on the clamp to swing; and

the locking mechanism is disposed on the angular oscillator and is fixedly connected with the first transmission rack.

10. The crawling welding robot according to claim 9, wherein the angular oscillator comprises a motor and a rotary platform which are connected with each other, the clamp is connected with the rotary platform, and the locking mechanism is connected with the motor.

11. The crawling welding robot according to any one of claims 8 to 10, wherein the welding load device further comprises a laser tracking linear oscillating mechanism and a laser tracking module;

the laser tracking linear oscillating mechanism comprises a second linear motor, a second linear guide rail, a fourth driving device, a second transmission gear, and a second transmission rack; and

the second linear motor is fixedly disposed on the weld holder, and the second linear guide rail is connected with the second linear motor; the second transmission gear is rotatably disposed on the second linear guide rail; the second transmission gear is meshed with the second transmission rack, and the second transmission rack is slidably engaged with the second linear guide rail; the fourth driving device is connected with the second transmission gear for driving the second transmission gear to rotate so as to drive a linear reciprocating movement of the second transmission rack.

12. The crawling welding robot according to claim 11, wherein

the laser tracking module comprises a camera, a laser sensor, a mounting frame, and a multi-filter;

the camera, the laser sensor, and the multi-filter are all disposed on the mounting frame; and

the mounting frame is fixedly disposed on the second transmission rack.

13. The crawling welding robot according to any one of claims 1 to 12, wherein the crawling welding robot further comprises a windproof device, and the windproof device is connected with the crawler frame;

the windproof device comprises a fixation support and a windshield which are connected with each other, and the fixation support is connected with the crawler frame; and

the fixation support comprises an retractable translation plate that can be extended and contracted in a frontward and rearward direction, the retractable translation plate is provided with a slideway in a leftward and rightward direction and a slideway in the frontward and rearward direction which have an angle formed therebetween, the windshield is provided with a slideway in an upward and downward direction, the retractable translation plate is connected with the windshield, and the windshield is slippable relative to the retractable translation plate in an extension direction of the slideway in the upward and downward direction and in an extension direction of the slideway in the leftward and rightward direction, so that the windshield can be adjusted in the three directions.

14. The crawling welding robot according to claim 13, wherein the fixation support further comprises a fixed bottom plate and a fixed connection plate which are connected with each other, and the fixed connection plate is slidably engaged with the retractable translation plate in an extension direction of the slideway in the frontward and rearward direction; and the fixed bottom plate is configured to be connected with the crawler frame.

15. The crawling welding robot according to claim 13 or 14, wherein the retractable translation plate comprises a first plate portion and a second plate portion which are connected with each other, an angle is formed between the first plate portion and the second plate portion, the slideway in the leftward and rightward direction is provided in the first plate portion, and the slideway in the frontward and rearward direction is provided in the second plate portion; the first plate portion is slidably connected with the windshield, and the second plate portion is slidably connected with the fixed connection plate.

16. The crawling welding robot according to claim 1, wherein the magnet module comprises a mounting shell, a cover body, and a magnet, the mounting shell is provided with a cavity, the magnet is placed in the cavity, and the cover body is connected with the mounting shell for covering the cavity.

17. The crawling welding robot according to claim 1 or 16, wherein each lifting mechanism comprises a support frame, a lifting screw, and an adjusting nut, the support frame is connected with the crawler frame, the lifting screw is screwed with the adjusting nut, the adjusting nut is rotatably connected with the support frame, and the adjusting nut is fixed to the support frame in an axial direction of the adjusting nut; and the lifting screw is connected with the magnet module.

18. The crawling welding robot according to claim 17, wherein the support frame comprises a groove body and a cover plate, and the groove body is provided with a limiting groove; the adjusting nut is provided with an annular limiting protrusion, the annular limiting protrusion extends in a circumferential direction of the adjusting nut, and the annular limiting protrusion protrudes outwardly, in a radial direction of the adjusting nut, from an outer circumferential surface of the adjusting nut; the annular limiting protrusion is located in the limiting groove, and the cover plate is connected with the groove body and is configured to cover a groove opening of the limiting groove, so that the annular limiting protrusion is restrained between the cover body and a groove bottom of the limiting groove.

19. A method of controlling the crawling welding robot according to claim 1, characterized by comprising following steps:

S1. controlling an adjustable magnetic adhesion module to maintain a stable adhesion force between the crawling welding robot and a surface to be adhered;

S2. obtaining information on a weld seam;

S3. controlling a welding gun to translate to a position of the weld seam;

S4. controlling the welding gun to rotate to an angle required for a process;

S5. adjusting process parameters of a welding power source;

S6. starting welding and controlling the crawling robot to automatically and autonomously crawl along the direction of the weld seam; and

S7. finishing welding.