[Claims]

[Claim 1]

A friction stir welding apparatus comprising:

a welding apparatus main body comprising a framework having a length larger than that of a welding line along which workpieces are welded,

a pair of workpiece fixing surface plates installed to form a gap extending along the welding line between the workpieces on an upper surface of the framework,

a friction stir welding tool disposed under the gap and protruding upward from the gap,

a spindle configured to attach the friction stir welding tool to an upper end section thereof, and

a spindle rotary driving apparatus configured to pivot the spindle;

a linear guide mechanism configured to movably support the welding apparatus main body along the gap; and

a moving apparatus configured to move the welding apparatus main body along the gap,

wherein the friction stir welding tool is a bobbin tool, and a resilient body configured to support the friction stir welding tool is installed between the friction stir welding tool and the spindle.

[Claim 2]

The friction stir welding apparatus according to Claim 1, wherein the linear guide mechanism comprises a roller circulation type linear guide block installed at the welding apparatus main body, and a linear guide rail installed at the framework to correspond to the linear guide block and extending along the gap.

[Claim 3]

The friction stir welding apparatus according to Claim 2, wherein the linear guide mechanism comprises the plurality of linear guide rails installed in parallel at the framework.

[Claim 4]

The friction stir welding apparatus according to Claim 2 or 3, wherein the linear guide mechanism supports the welding apparatus main body via the plurality of linear guide blocks per one linear guide rail.

~~[Claim 5]~~

~~The friction stir welding apparatus according to any one of Claims 1 to 4, wherein the friction stir welding tool is a bobbin tool, and a resilient body configured to support the friction stir welding tool is installed between the friction stir welding tool and the spindle.~~

[Claim 5~~6~~]

The friction stir welding apparatus according to any one of Claims 1 to 4~~5~~, wherein a casing configured to form an oil cooling space is installed at an outer circumferential side of the spindle of the welding apparatus main body, the spindle is rotatably supported by the casing via a bearing, and lubricant is circulated through the bearing and the oil cooling space.

[Claim 6~~7~~]

The friction stir welding apparatus according to any one of Claims 1 to 5~~6~~, wherein a cooling nozzle configured to vary an ejecting direction of a gas to cool the outer circumferential side of the friction stir welding tool is installed at the welding apparatus main body.

[Claim 7~~8~~]

The friction stir welding apparatus according to any one of Claims 1 to 6~~7~~, wherein the moving apparatus comprises an endless winch, and a strand-shaped member wound on the endless winch and connecting both ends thereof to both end sections in a moving direction of the welding apparatus main body, and the welding apparatus main body is moved by driving of the endless winch.