

ONE-SIDE WELDING EQUIPMENT

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to one-side welding equipment for use in one-side welding for weld members to be welded, for example, metal plates.

2. Description of the Related Art

Japanese Patent No. 3526152 discloses one-side welding equipment for use in one-side welding for weld members such as metal plates. This one-side welding equipment includes a pair of first and second clamp beams that clamp steel plates from above, and a traveling rail provided on an upper surface of one of the clamp beams. Welding is performed while causing a rail carriage with a welding unit mounted thereon to travel on the traveling rail.

The one-side welding equipment includes the first clamp beam and the second clamp beam that are movable up and down, and the welding unit that is provided on one of the first and second clamp beams and can travel along a welding line. Therefore, welding can be performed while preventing deformation of the steel plates before and during welding. This allows one-side welding to be conducted on not only thick steel plates, but also thin steel plates.

However, with recent increases in number of weld

members for large-sized ships, there is a demand for large-sized one-side welding equipment that needs a beam span of several tens of meters or more. Therefore, in the above-described welding equipment in which the welding unit travels on the rail, if the length of the clamp beams increases, it is difficult to remove the influences of deformation of the clamp beams themselves and deformation of the weld members. Moreover, derailing is easily caused by small loss of balance, and slight meandering occurs in the welding unit. This makes accurate welding difficult.

Accordingly, in one method of the related art, weld members are fixed by an electromagnet provided on a panel line serving as a platen for the weld members in order to prevent deformation of the weld members. In another method, a welding carriage is not provided on a clamp beam above weld members, but is hanging from a beam having a beam span of 20 m or more.

However, the above-described welding carriage that travels on the rail provided on the long beam wobbles during traveling by the influence of bending of the beam due to its own weight. As a result, this wobble adversely affects the welded portion that requires accurate control of the order of millimeters or less.

SUMMARY OF THE INVENTION

The present invention provides one-side welding equipment that can perform stable welding with a welding carriage that travels on a welder beam.

To solve the above-described problems, one-side welding equipment according to an aspect of the present invention includes a welder beam extending linearly; a welding carriage that travels in a longitudinal direction of the welder beam and that is hung and supported in a cantilevered manner along a side face of the welder beam; a backing device provided on a back side of a welding line on a weld member to be welded; and a bearing rail and a gear rack provided on an upper surface of the welder beam and extending parallel to each other in the longitudinal direction of the welder beam. The welding carriage includes a first traveling mechanism having a bearing to be engaged with the bearing rail, a second traveling mechanism having a pinion to be engaged with the gear rack and a wheel that rolls in the longitudinal direction of the welder beam while being in contact with an upper surface of the gear rack, a welding-wire supply nozzle provided at an end of the welding carriage, a welding-line-position detecting mechanism that detects a position of the welding line and generates a detection signal indicating the position, and a nozzle-movement control device that receives the detection signal from the welding-line-position detecting mechanism and

controls a moving direction and a moving distance of the welding-wire supply nozzle on the basis of the detection signal. The nozzle-movement control device moves the welding-wire supply nozzle in a thickness direction and a width direction of the weld member so that a tip of the welding-wire supply nozzle is located above the welding line.

In the one-side welding equipment having the above-described configuration, the welding carriage hanging in a cantilevered manner from the linear welder beam moves on the welder beam with the first traveling mechanism and the second traveling mechanism being disposed therebetween, and performs welding along the welding line on the weld member backed by the backing device. In this case, the welding-line-position detecting mechanism detects the position of the welding line beforehand, and the nozzle-movement control device controls the moving direction and moving distance of the welding-wire supply nozzle so that the welding-wire supply nozzle moves along the detected position of the welding line. Hence, even when the welder beam is bent downward by the load of the welding carriage, the position of the tip of the welding-wire supply nozzle can be located above the welding line.

Preferably, the welder beam is formed by joining a plurality of beam pieces in the longitudinal direction of the welder beam, and the beam pieces are worked to have a

cross-sectional angle less than 90° at a welded portion so that the welder beam is shaped like an upward convex arch in a no-load state in which the welding carriage is not hung and supported and is substantially horizontal in a load state in which the welding carriage is hung and supported.

With this structure, when the welding carriage moves on the welder beam, the welder beam is pushed down by the load of the welding carrier, and the change in position of the welding carrier in the up-down direction decreases.

Therefore, even when the load of the welding carrier is applied to the welder beam, the position of the tip of the welding-sire supply nozzle can be located above the welding line.

Preferably, the wheel of the second traveling mechanism includes a front wheel and a rear wheel spaced in the longitudinal direction of the welder beam. The second traveling mechanism further includes a frame provided between the wheels so as to rotatably support the wheels. The frame has a center portion supported at one point by the welding carrier.

With this structure, the front and rear wheels that roll on the upper surface of the gear rack are supported by the frame, and the center portion of the frame is supported at one point by the welding carrier, whereby the load of the welding carrier is equally applied to the wheels at both

ends of the frame via the frame. Therefore, the wheels roll in contact with the upper surface of the gear rack without falling off, and an accurate straight traveling ability can be obtained.

Preferably, the welder beam has a projecting portion that is provided on a side face opposite the side face along which the welding carrier is hung and supported in the cantilevered manner and that extends in the longitudinal direction of the welder beam, and the welding carrier has a fall-preventive bracket to be engaged with the projecting portion.

With this structure, even if the welding carrier is tilted by, for example, failure of the bearing, the fall-preventive bracket is caught by the projecting portion. Therefore, it is possible to maintain the balance of the welding carrier so that the welding carrier does not fall.

Preferably, the fall-preventive bracket is equal in number to the bearing to be engaged with the bearing rail.

With this structure, since the same number of fall-preventive brackets as the number of bearings serving as base points where the load of the welding carrier is applied, when the welding carrier tilts, the fall-preventive brackets are firmly caught by the projecting portions. Therefore, it is possible to maintain the balance of the welding carrier and to more effectively prevent falling.

Preferably, the first traveling mechanism includes a bracket having a lower end to which the bearing is fixed and having a through hole extending in the longitudinal direction of the welder beam, and a dustproof cover inserted in the through hole so as to cover an upper surface of the bearing rail.

With this structure, since the dustproof cover is provided to cover the upper surface of the bearing rail, dust is prevented from entering an engaged portion between the bearing rail and the bearing. This maintains a proper engaging state.

Preferably, the one-side welding equipment further includes a cable handling device provided between the bearing rail and the gear rack on the upper surface of the welder beam or on the side face of the welder beam.

With this structure, cables can be efficiently and safely stored in the cable handling device provided in an empty space in the one-side welding equipment.

Preferably, the upper surface of the welder beam has recesses that receive the bearing rail and the gear rack respectively.

With this structure, the upper surface of the welder beam is worked to have the recesses for receiving the bearing rail and the gear rack. Hence, it is unnecessary to weld a member to the welder beam. This simplifies the

production process and reduces the production cost.

According to the one-side welding equipment of the aspect of the present invention, even when the welder beam is bent downward by the load of the welding carriage, which is hung and supported along the side face of the welder beam, during traveling of the welding carriage, the tip of the welding-wire supply nozzle 23 can be aligned with the welding line, so that stable welding can be performed.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic front view illustrating a configuration of one-side welding equipment according to an embodiment;

Figs. 2A and 2B are schematic side views illustrating a structure of a welder beam provided in the one-side welding equipment, Fig. 2A illustrates a state of a plurality of beam pieces that form the welder beam before joining, and Fig. 2B illustrates a state of the beam pieces after joining;

Figs. 3A and 3B are a schematic plan view and a schematic side view of the one-side welding equipment of the embodiment, respectively, illustrating the overall configuration of the welder beam provided in the one-side welding equipment;

Figs. 4A and 4B illustrate structures of a first

traveling mechanism and a second traveling mechanism provided in the one-side welding equipment, Fig. 4A is a schematic right side view on arrow IVA in Fig. 1, and Fig. 4B is a schematic cross-sectional view taken along line IVB-IVB in Fig. 1; and

Fig. 5 is a schematic cross-sectional view illustrating the structures of the first traveling mechanism and the second traveling mechanism in the one-side welding equipment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

One-side welding equipment 100 according to an embodiment will be described below with reference to the drawings.

As illustrated in Fig. 1, the one-side welding equipment 100 mainly includes a welder beam 10, a welding carriage 20 hung and supported in a cantilevered manner along a side face of the welder beam 10, and a backing device 30 provided on a back side of a welding line M.

As illustrated in Figs. 1 and 3A, the welder beam 10 is a linear frame that supports the welding carriage 20 movably. The welder beam 10 is shaped like a hollow square pipe formed of a metal material as an example. Further, the welder beam 10 is substantially parallel to the welding line M where weld members 1 are abutted against each other, and is formed by joining a plurality of beam pieces so that the

length thereof is longer than that of the weld members 1.

As illustrated in Figs. 1 and 3A, on an upper surface of the welder beam 10, a bearing rail 11 and a gear rack 12 extend in parallel and in the longitudinal direction of the welder beam 10. The bearing rail 11 and the gear rack 12 will be described below.

As illustrated in Figs. 2A and 2B, the welder beam 10 is preferably formed by joining a plurality of beam pieces (e.g., a first beam piece 10a and a second beam piece 10b) worked to have a cross-sectional angle θ_1 less than 90° at a welded portion.

When the welder beam 10 is thus formed by joining a plurality of beam pieces worked to have a cross-sectional angle θ_1 less than 90° , the welder beam 10 is shaped like an upward convex arch in a no-load state in which the welding carriage 20 is not hung and supported on the welder beam 10, as illustrated in Fig. 3B. In contrast, in a load state in which the welding carriage 20 is hung and supported, the welder beam 10 deflects downward into a substantially horizontal position owing to the load of the welding carriage 20. Therefore, even when the welder beam 10 has a large length of several meters, fluctuation of welding can be suppressed and stable welding can be performed. Fig. 3B exaggeratingly illustrates the arch shape of the welder beam 10.

The cross-sectional angle θ_1 of the first beam piece 10a and the second beam piece 10b that form the welder beam 10 is appropriately adjusted in accordance with the weight of the welding carriage 20 and the length of the welder beam 10. However, if the cross-sectional angle θ_1 of the first beam piece 10a and the second beam piece 10b is too sharp, the welder beam 10 is sometimes not sufficiently pushed down into a horizontal position by the load of the welding carriage 20. In contrast, if the cross-sectional angle θ_1 is too close to 90° , the welder beam 10 is sometimes excessively pushed down by the load of the welding carriage 20, and does not become horizontal.

The number of beam pieces that form the welder beam 10 is not particularly limited. For example, the number is preferably two or three.

As illustrated in Fig. 1, a projecting portion 13 is preferably provided on a side face of the welder beam 10 opposite the side where the welding carriage 20 is hung and supported in a cantilevered manner. As will be described below, the projecting portion 13 is engageable with fall-preventive brackets 27, and has a predetermined length along the side face of the welder beam 10, as illustrated in Figs. 3A and 4A.

By thus forming the projecting portion 13 on the side face of the welder beam 10, even if the welding carriage 20

is tilted to the right by failure of bearings 21a or the like, as viewed from the front side of Fig. 1, the fall-preventive brackets 27 engage the projecting portion 13, so that the welding carriage 20 is prevented from falling. Therefore, the balance of the welding carriage 20 can be maintained.

As illustrated in Fig. 1, a cable handling device 14 is preferably provided between the bearing rail 11 and the gear rack 12 on the upper surface of the welder beam 10. The cable handling device 14 stores various types of cables for use in the one-side welding equipment 100, and extends along the upper surface of the welder beam 10, as illustrated in Fig. 3A. By thus providing the cable handling device 14 between the bearing rail 11 and the gear rack 12, various cables for use in the one-side welding equipment 100 can be stored efficiently and safely. Although not shown, the cable handling device 14 may be provided on the side face of the welder beam 10.

As illustrated in Fig. 5, the upper surface of the welder beam 10 preferably has recesses 11a and 12a in which the bearing rail 11 and the gear rack 12 are provided respectively. The recesses 11a and 12a extend in the longitudinal direction of the welder beam 10. By thus forming the recesses 11a and 12a in the upper surface of the welder beam 10, it is unnecessary to weld a member to the

welder beam 10. This simplifies the production process and reduces the production cost.

When the welder beam 10 is formed by a plurality of beam pieces, as described above, joinability between the beam pieces can be enhanced by forming the recesses 11a and 12a in the upper surface of each beam piece and arranging the bearing rail 11 and the gear rack 12 in the recesses 11a and 12a, respectively. Moreover, the bearing rail 11 and the gear rack 12 can be arranged more linearly on the welder beam 10 with the recesses 11a and 12a being disposed therebetween. This allows the welding carriage 20 to travel more smoothly.

As illustrated in Figs. 1 and 3A, the bearing rail 11 is a linear rail member provided on the welder beam 10 so that a first traveling mechanism 21, which will be described below, can travel on the welder beam 10. The gear rack 12 is a linear rack member provided on the welder beam 10 so that a second traveling mechanism 22, which will be described below, can travel on the welder beam 10. A side face of the gear rack 12 has teeth with which a pinion 22a (see Fig. 5) of the second traveling mechanism 22 can engage. The teeth are provided in the longitudinal direction of the welder beam 10. The bearing rail 11 and the gear rack 12 are joined on the welder beam 10 by welding or bolts and nuts (not shown).

The welding carriage 20 welds weld members 1 along the welding line M while traveling in the longitudinal direction of the welder beam 10. As illustrated in Fig. 1, the welding carriage 20 is hung and supported in a cantilevered manner along the side face of the welder beam 10. Further, the welding carriage 20 is supported on the welder beam 10 with the below-described first and second traveling mechanisms 21 and 22 being disposed therebetween in a manner such as to travel in the longitudinal direction of the welding line M.

As illustrated in Fig. 1, the welding carriage 20 includes a head frame 20a formed by a vertical base member extending substantially perpendicularly to the weld members 1, and a carriage body 20b formed by a horizontal base member extending substantially parallel to the weld members 1. The head frame 20a and the carriage body 20b are preferably formed of a metal material so as to have a predetermined rigidity.

The head frame 20a includes the first traveling mechanism 21 and the second traveling mechanism 22 that travel on the welder beam 10, and a welding-wire supply nozzle 23 and a welding-line-position detecting mechanism 24 provided at an end of the head frame 20a. The carriage body 20b includes a nozzle-movement control device 25 that controls the movement of the welding-wire supply nozzle 23,

and a flux circulator 26 that supplies flux to the weld members 1.

As illustrated in Fig. 1, the first traveling mechanism 21 is a member suspended from the carriage body 20b, and allows the welding carriage 20 to travel in the longitudinal direction on the welder beam 10. As illustrated in Fig. 5, the first traveling mechanism 21 includes bearings 21a. Engagement of the first traveling mechanism 21 with the bearing rail 11 allows the welding carriage 20 to travel in the longitudinal direction on the welder beam 10.

As illustrated in Figs. 4 and 5, the first traveling mechanism 21 preferably also includes brackets 21b having lower ends to which the bearings 21a are fixed and through holes 21c extending in the longitudinal direction of the welder beam 10, a dustproof cover 21d inserted in the through holes 21c so as to cover an upper surface of the bearing rail 11, and flanges 21e provided at upper ends of the brackets 21b so as to connect the brackets 21b to the carriage body 20b.

In general, fine dust or the like easily accumulates on the bearing rail 11 because the bearing rail 11 is provided at a position near the ceiling where maintenance operation is difficult. Therefore, the bearings 21a of the welding carriage 20 are sometimes deteriorated by the influence of the dust or the like, and as a result, a welded portion that

requires precise control of the order of millimeters or less is affected adversely. In the worst case, the bearings 21a are broken and the welding carriage 20 becomes unable to travel. However, when the upper surface of the bearing rail 11 is covered with the dustproof cover 21d, as described above, dust can be prevented from entering the engaged portions between the bearing rail 11 and the bearings 21a. This allows stable welding.

As illustrated in Fig. 1, the second traveling mechanism 22 is a member suspended from the carriage body 20b, and allows the welding carriage 20 to travel in the longitudinal direction on the welder beam 10, in cooperation with the first traveling mechanism 21. As illustrated in Fig. 5, the second traveling mechanism 22 includes a pinion 22a to be engaged with the gear rack 12, wheels 22b that roll in the longitudinal direction while being in contact with the upper surface of the gear rack 12, a bracket 22c that supports the wheels 22b rotatably, and a flange 22d that fixes the bracket 22c to the carriage body 20b. A motor (not shown) is provided on the pinion 22a so as to rotate the pinion 22a. By driving the motor, the entire welding carriage 20 including the first traveling mechanism 21 and the second traveling mechanism 22 travels in the longitudinal direction of the welder beam 10.

As illustrated in Fig. 4B, the second traveling

mechanism 22 preferably includes front and rear wheels 22b spaced in the longitudinal direction of the welder beam 10, and a frame 22e provided between the front and rear wheels 22b so as to rotatably support the wheels 22b. The frame 22e is a member shaped like a long plate formed of a metal material as an example, and rotatably supports the wheels 22b at both ends thereof.

As illustrated in Fig. 4B, a center portion of the frame 22e in the longitudinal direction and the height direction is retained on a bottom surface of the carriage body 20b by a retaining member 28. That is, the frame 22e is supported at one point on the carriage body 20b by the retaining member 28. When the frame 22e is thus supported at one point on the carriage body 20b, the load of the welding carriage 20 is equally applied to the wheels 22b at both ends of the frame 22e via the frame 22e. Therefore, the wheels 22b roll in contact with the upper surface of the gear rack 12 without falling off. This provides an accurate straight running ability.

As illustrated in Fig. 1, the welding-wire supply nozzle 23 is provided at the end of the welding carriage 20, and supplies a welding wire W to the weld members 1. The welding-wire supply nozzle 23 supplies the welding wire W to the weld members 1 along the welding line M while moving in the thickness direction and the width direction of the weld

members 1 according to instructions from the nozzle-movement control device 25 that will be described below. Therefore, even when the welder beam 10 is slightly bent downward by the load of the welding carriage 20, stable welding can be performed.

The welding-line-position detecting mechanism 24 is a sensor mechanism that detects the position of the welding line M. The welding-line-position detecting mechanism 24 moves ahead of the welding-wire supply nozzle 23 along the welding line M during welding so as to detect positional information about the welding line M. The welding-line-position detecting mechanism 24 generates a detection signal according to the positional information, and transmits the detection signal to the nozzle-movement control device 25 that will be described below.

In the welding-line-position detecting mechanism 24, a guide roller rolls in a groove ahead of a portion to be welded, and a shaft that holds the roller slightly moves in the up-down direction and the right-left direction to perform detection when the position of the welding line deviates.

The nozzle-movement control device 25 controls the moving direction and moving distance of the welding-wire supply nozzle 23 at the end of the head frame 20a according to the detection signal received from the welding-line-

position detecting mechanism 24. The nozzle-movement control device 25 reads the positional information about the welding line M from the detection signal, commands a nozzle moving device (not shown) provided in the head frame 20a to place a tip of the welding-wire supply nozzle 23 at a predetermined height from the welding line M, and moves the welding-wire supply nozzle 23 in the thickness direction and width direction of the weld members 1. For example, the nozzle-movement control device 25 can be formed by a sequencer provided on the carriage body 20b.

The flux circulator 26 is a container in which flux to be supplied for welding circulates. In the welding-wire supply nozzle 23 at the end of the head frame 20a, a pair of flux supply nozzles (not shown) are juxtaposed. To the flux supply nozzles, flux is supplied through a flux supply tube (not shown) connected to a tapered bottom portion of the flux circulator 26. Flux that has been sprayed to the weld members 1 by the flux supply nozzles, but has remained without being used for welding is recovered to the flux circulator 26 by a flux recovery mechanism (not shown).

As illustrated in Figs. 1 and 4A, the carriage body 20b preferably includes the fall-preventive brackets 27. For example, the fall-preventive brackets 27 are rod-shaped members formed of a metal material, and prevent falling of the welding carriage 20 by engaging with the projecting

portion 13, as described above. As illustrated in Fig. 1, upper ends of the fall-preventive brackets 27 are fixed to the carriage body 20b, and lower ends of the fall-preventive brackets 27 are bent toward the side face of the welder beam 10 with a small gap therebetween so that the lower ends can engage with the projecting portion 13 when the welding carriage 20 tilts.

Preferably, the number of fall-preventive brackets 27 is the same as the number of bearings 21a engaged with the bearing rail 11, as illustrated in Fig. 4A. By setting the number of fall-preventive brackets 27 in correspondence to the number of bearings 21a, when the welding carriage 20 tilts, the fall-preventive brackets 27 are more firmly caught by the projecting portion 13. Therefore, it is possible to maintain the balance of the welding carriage 20 and to more effectively prevent falling.

The backing device 30 is provided on the back side of the welding line M of the weld members 1 so as to press the flux against the back side. The backing device 30 includes a backing portion 30a that presses the flux from the back side of the welding line M, a lifting unit 30b that moves the backing portion 30a up and down in the thickness direction of the weld members 1, a penal moving roller 30c and auxiliary rollers 30d on which the weld members 1 is placed and which move the weld members 1 in the longitudinal

direction, a magnet mechanism 30e that attracts and fixes the weld members 1, and a beam member 30f serving as a base member for supporting these members. The beam member 30f is provided with wheels 30g to be engaged with a rail 40 extending parallel to the longitudinal direction of the weld members 1.

The operation of the one-side welding equipment 100 according to the embodiment will be described below with reference to Fig. 1. First, the weld members 1 are placed on the backing device 30, are moved in the horizontal direction by the penal moving roller 30c and the auxiliary rollers 30d, and are aligned so that the backing portion 30a is located just below the back side of the welding line M. After the completion of alignment, the weld members 1 are attracted and fixed by the magnet mechanism 30e.

Next, the nozzle moving device (not shown) in the head frame 20a is moved for alignment so that the welding-wire supply nozzle 23 and the welding-line-position detecting mechanism 24 are located just above the welding line M. After completion of alignment, welding is performed while moving the welding carriage 20 along the welding line M in the longitudinal direction of the welder beam 10.

During welding of the weld members 1, before the welding wire W is supplied by the welding-wire supply nozzle 23, the welding-line-position detecting mechanism 24 detects

the position of the welding line M while moving on the welding line M, and transmits a detection signal indicating the position to the nozzle-movement control device 25. According to the detection signal, the nozzle-movement control device 25 moves the welding-wire supply nozzle 23 in the thickness direction and width direction of the weld members 1 so that the welding-wire supply nozzle 23 is located at the predetermined height of the welding line M. Therefore, even if the welder beam 10 is somewhat bent downward by the load of the welding carriage 20, stable welding can be performed along the welding line M.

In addition to the above, when the welder beam 10 is shaped like an arch by joining a plurality of beam pieces worked to have a cross-sectional angle θ_1 less than 90° , as illustrated in Fig. 3B, a synergistic effect can be obtained. That is, the welder beam 10 is formed by joining a plurality of beam pieces worked to have a cross-sectional angle θ_1 less than 90° so as to be shaped like an upward convex arch in a no-load state in which the welding carriage 20 is not hung and supported on the welder beam 10 and so as to be substantially horizontal in a load state in which the welding carriage 20 is hung and supported on the welder beam 10. Thus, even if the welder beam 10 is bent downward by the load of the welding carriage 20, the height of the welding-wire supply nozzle 23 from the weld members 1 can be

kept substantially fixed, and this makes welding stable.

As described above, according to the one-side welding equipment 100 of the embodiment, even when the welder beam 10 is bent downward by the load of the welding carriage 20, which is hung and supported along the side face of the welder beam 10, during traveling of the welding carriage 20, the tip of the welding-wire supply nozzle 23 can be aligned with the welding line M, so that stable welding can be performed.

WHAT IS CLAIMED IS:

1. One-side welding equipment comprising:
 - a welder beam extending linearly;
 - a welding carriage that travels in a longitudinal direction of the welder beam and that is hung and supported in a cantilevered manner along a side face of the welder beam;
 - a backing device provided on a back side of a welding line on a weld member to be welded; and
 - a bearing rail and a gear rack provided on an upper surface of the welder beam and extending parallel to each other in the longitudinal direction of the welder beam, wherein the welding carriage includes
 - a first traveling mechanism having a bearing to be engaged with the bearing rail,
 - a second traveling mechanism having a pinion to be engaged with the gear rack and a wheel that rolls in the longitudinal direction of the welder beam while being in contact with an upper surface of the gear rack,
 - a welding-wire supply nozzle provided at an end of the welding carriage,
 - a welding-line-position detecting mechanism that detects a position of the welding line and generates a detection signal indicating the position, and

a nozzle-movement control device that receives the detection signal from the welding-line-position detecting mechanism and controls a moving direction and a moving distance of the welding-wire supply nozzle on the basis of the detection signal, and

wherein the nozzle-movement control device moves the welding-wire supply nozzle in a thickness direction and a width direction of the weld member so that a tip of the welding-wire supply nozzle is located above the welding line.

2. The one-side welding equipment according to Claim 1, wherein the welder beam is formed by joining a plurality of beam pieces in the longitudinal direction of the welder beam, and

wherein the beam pieces are worked to have a cross-sectional angle less than 90° at a welded portion so that the welder beam is shaped like an upward convex arch in a no-load state in which the welding carriage is not hung and supported and is substantially horizontal in a load state in which the welding carriage is hung and supported.

3. The one-side welding equipment according to Claim 1 or 2,

wherein the wheel of the second traveling mechanism includes a front wheel and a rear wheel spaced in the

longitudinal direction of the welder beam, and

wherein the second traveling mechanism further includes a frame provided between the front and rear wheels so as to rotatably support the wheels, and the frame has a center portion supported at one point by the welding carrier.

4. The one-side welding equipment according to Claim 1 or 2,

wherein the welder beam has a projecting portion that is provided on a side face opposite the side face along which the welding carrier is hung and supported in the cantilevered manner and that extends in the longitudinal direction of the welder beam, and

wherein the welding carrier has a fall-preventive bracket to be engaged with the projecting portion.

5. The one-side welding equipment according to Claim 4, wherein the fall-preventive bracket is equal in number to the bearing to be engaged with the bearing rail.

6. The one-side welding equipment according to Claim 1 or 2,

wherein the first traveling mechanism includes a bracket having a lower end to which the bearing is fixed and having a through hole extending in the longitudinal

direction of the welder beam, and a dustproof cover inserted in the through hole so as to cover an upper surface of the bearing rail.

7. The one-side welding equipment according to Claim 1 or 2, further comprising:

a cable handling device provided between the bearing rail and the gear rack on the upper surface of the welder beam or on the side face of the welder beam.

8. The one-side welding equipment according to Claim 1 or 2,

wherein the upper surface of the welder beam has recesses that receive the bearing rail and the gear rack, respectively, and that are arranged in succession in the longitudinal direction of the welder beam.