

SPECIFICATION

CONSTRUCTION METHOD FOR EMPLACING MAIN-BEAM AND CENTERING ADJUSTMENT APPARATUS FOR MAIN-BEAM

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

The present invention relates to a construction method for emplacing a main-beam and a centering adjustment apparatus for a main-beam and, in particular, to a construction method for emplacing a main-beam and a centering adjustment apparatus for a main-beam, employed when a large scale boiler for a thermal power plant or the like is lifted up and constructed while being supported and suspended from the upper portion of a structure erected with steel frames.

2. DESCRIPTION OF THE RELATED ART

Hitherto, a suspension type has been adopted for a boiler used for a thermal power plant and the like, but most constructing works for the boiler are conducted at an elevated spot, which are quite dangerous and inefficient. In general, a building to house the boiler is first constructed with a steel frame and then a suspending frame to support the weight of the boiler is attached to the top portion of the steel frame so that parts of the boiler are attached to the suspending frame. The suspending frame forms a frame base with main-beams, mid-beams for coupling the main-beams and so on, and a shelf member called a wisteria trellis is constructed in the frame base. Many sling rods are fixed to the wisteria trellis, and coupled to and suspend the boiler parts. On such construction of the boiler, since the boiler parts are assembled one by one downward from a height of several tens of meters in order to construct the boiler to extend downward relative to the suspending frame positioned above, the temporary provision of a safety net or a scaffold for the assembling work is required at each working stage, which results in

extreme inefficiency.

From these points of view, a method has been proposed, in which a main-beam for supporting a boiler is attached to a lower portion of a stanchion which is to be the top portion of the stanchion of the steel frame, and then the assembling work for the boiler structure is performed while the main-beam is lifted up along the stanchion structure in accordance with the progress of the assembling work so as to avoid works at high elevations.

However, in the lifting-up method using a stanchion of a steel frame as a guide, since a boiler structure weighing as much as 2,000 tons are moved upward along the steel stanchions, it has a disadvantage in which the stanchion of the steel frame having a height of nearly 100 meters slants towards the lifting-up work side due to the load of lifted materials including the main-beam. Particularly, in a formation for lifting up a main-beam in which a temporary beam is projected from the top portion of a stanchion for lifting up the main-beam; and a plurality of rods coupled to be in a wire shape are suspended from a boiler jack mounted on the temporary beam; and the main-beam is lifted up intermittently by operation of the jack, a large bending moment acting on the stanchion causes a phenomenon that the top of the stanchion inclines about 30 mm toward the inside. Usually, in construction of the stanchion, the stanchion of the steel frame, which is constructed upward one by one by a knot unit, may slant outward depending on the way of applying the lifted load or the way of construction. The above slanting of the stanchion means that a suitable butting can not be obtained at the position of emplacement when the main-beam is intended to fit in a span of the stanchions. Thus, it is required that the length of the main-beam and the span of the stanchions are designed to conform to each other at the position of emplacement of the main-beam (at the top portions of the stanchions).

Furthermore, in case of a stanchion having nearly 100 meter in height, it is necessary to consider a twist at the top of the stanchion. When such a twist happens, a faceplate to join with the main-beam can not be suitably attached after arriving at the height of installation. Therefore, it is also

required to improve the difficulty of the emplacement work accompanied by such a twist.

SUMMARY OF THE INVENTION

The present invention relates to a construction method of emplacing a main-beam and a centering adjustment apparatus for a main-beam, and an object of the present invention is to provide steps for smooth emplacement of main-beams in a manner that pre-adjustment work can be omitted, and a centering adjustment and also adjustment for a twist of a stanchion structure and a space between the stanchion and the main-beam can be facilitated while the main-beam is being lifting up.

In order to achieve the object, when the main-beam suspending a subject is lifted up between a pair of steel frame stanchions and fixed on the top portion of the stanchion structure, a hydraulic jack means is reversibly mounted on a side end portion of the main-beam. And when the distance between the stanchions is shorter than the length of the main-beam, a pushing slide operation for the stanchion is carried out by the hydraulic jack. In the reverse case a drawing-in operation for the stanchion is carried out by the hydraulic jack. Direction that the hydraulic jack means is mounted is designed to be shifted in accordance with a detected value for the length of the emplacement distance between a pair of the stanchions, and the distance between the stanchion structure is conformed to the length of the main-beam, thereby allowing the emplacement of the main-beam to the stanchion structure.

According to the present invention, the following effects can be obtained. That is, in an emplacement work of a main-beam which needs to hoist a subject to an elevated spot, it needs no preparatory adjustment work, and a centering adjustment and adjustment for a twist of a stanchion structure and a space between the stanchion and the main-beam can be facilitated while the main-beam is being lifting up, so that the main-beam can be easily

emplaced to the stanchion.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1(A) and Fig. 1(B) respectively are a front view and a side elevational view showing an emplacing work stage of a main-beam;

Fig. 2 is a front view showing the main-beam being suspended;

Fig. 3 is a fragmentary perspective view of the main-beam which is closely approaching to an emplacement position;

Fig. 4 is a front view of Fig. 3;

Fig. 5 is a front view of the main-beam which reaches the emplacement position;

Fig. 6 is a side elevational view to explain a twist adjustment of the main-beam;

Fig. 7 is a plane view of Fig. 6;

Fig. 8 is a front view showing a pulling operation of stanchions; and

Fig. 9 is a plane view of Fig. 8.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

A specific embodiment of a construction method of emplacing a main-beam and a centering adjustment apparatus for a main-beam according to the present invention will be explained below.

A construction method of emplacing the main-beam according to the present invention is a construction method of emplacing the main-beam in which a main-beam suspending a subject is lifted up between a pair of stanchion structures and fixed to a top portion of the stanchion structure. Particularly, the above method is conducted so that the stanchion structure is prevented from slanting inward by lifting up and moving the main-beam while a distance between a pair of the stanchion structures is pushed and

enlarged by a pressing and slidably-moving means provided on the main-beam, in a moving process of the main-beam toward the emplacement position to the stanchion structure so that the main-beam is emplaced to the stanchion structure.

Alternatively, the present invention can be made up as follows: a construction method of emplacing main-beam in which a main-beam suspending a subject is lifted up between a pair of stanchion structures and butted against each top portion of the stanchion structures, includes a step of adjusting a distance between a pair of the stanchion structures to conform with a length of the main-beam by a drawing-in means for drawing each stanchion structures toward the main-beam, at an emplacement position of the main-beam to the stanchion structure so that the main-beam is emplaced to the stanchion structures.

The present invention can be also structured as follows. A construction method of emplacing main-beam in which a main-beam suspending a subject is lifted up between a pair of stanchion structures and butted against each top portion of the stanchion structures, includes the steps of: mounting a hydraulic jack means on a side end portion of the main-beam to reverse the mounted direction of the hydraulic jack; shifting the mounted direction of the hydraulic jack means in accordance with a detected value of an emplacement distance between a pair of the stanchion structures to push against and slide on the stanchion by the hydraulic jack means when the distance between a pair of the stanchion structures is shorter than an emplacement length of the main-beam, and to draw the stanchion structure toward the main-beam by the hydraulic jack means when the distance between a pair of the stanchion structures is longer than an emplacement length of the main-beam; and thus conforming the distance between a pair of the stanchion structures with the length of the main-beam so that the main-beam is emplaced to the stanchion structures.

In the above three cases, after the main-beam is lifted up and spanned between a pair of the stanchion structures, a relative facial deviation between the main-beam and the stanchion structure is adjusted by a guide space,

provided at one of the stanchion structure and the main-beam, and an abutting means, provided at the other of the stanchion structure and the main-beam, for abutting onto each of parallel walls of the guide space, so that a faceplate is attached to a butting portion of the stanchion structure and the main-beam.

Moreover, a centering adjustment apparatus for a main-beam according to the present invention is a centering adjustment apparatus for a main-beam in which a main-beam suspending a subject is lifted up between a pair of stanchion structures and butted against each top portion of the stanchion structures, including: a hydraulic jack mounted on the main-beam to reverse the mounted direction; a sliding means attached in a pushing operation against the stanchion structure by the hydraulic jack; a coupling means for coupling to the stanchion structure in a drawing operation performed by the hydraulic jack; and a sliding guide, provided at the stanchion structure, for the sliding means. It is advisable to include a guide space provided at one of the stanchion structure and the main-beam; and an extending means, provided at the other of the stanchion structure and the main-beam, for extending onto each of the parallel walls of the guide space, so that a relative facial deviation between the main-beam and the stanchion structure is adjusted by the abutting action of the extending means to the guide space.

The subject matter of the present invention will be clear by the following specific embodiment.

Figs.1 to Fig. 4 are explanatory views of the construction method of emplacing main-beams according to the embodiment of the present invention. After steel-frame stanchions forming a building to house a boiler are erected and main-beams are suspended by suspending rods from a temporary beam provided on the top ends of the stanchions, the main-beams are lifted up while component blocks of the boiler are being assembled. In the above process, the construction method of emplacing the main-beams according to the embodiment is a method for which both ends of a main-beam are butted against a temporary beam of a stanchion and completely integrated therewith.

In parallel with or simultaneous with the assembling processes of a steel frame, a steel frame stanchion 20 is successively erected upward from the first knot as the lowermost part. As shown in Fig. 2, the steel frame stanchion 20 is successively erected with each knot from the bottom portion by combining a plurality of stanchion members 22 with trusses (not shown) for coupling the stanchion members 22, in which the erection is performed by conveying and lifting up frame members using a truck crane or a crawler crane and coupling the frame members mutually. The steel frame stanchion 20 results having a height corresponding to the building by erecting a number of knots in order. To the inside of the upper end portion of the steel frame stanchion 20 erected as described above, a beam for attaching the main-beam which is to be finally butted against both ends of a supporting structure 24 for supporting the boiler suspension is provided.

As shown in Fig. 2, the suspending frame 24 for supporting the boiler suspension which is to be attached to the top portion of the steel frame stanchion 20, has a plurality of main-beams 26 (one main-beam 26 in the drawing) as a load supporting base and mid-beams 28 coupling the main-beams 26 mutually, and forms therein the so-called wisteria trellis by fastening sub-beams 30 on the top face of the mid-beams 28 to make a lattice. The wisteria trellis is disposed in the lower portion of the main-beam 26, and attached thereto with sling rods 32 for supporting the boiler to extend the sling rod 32 downward. The boiler is supported by suspending and coupling the components of the boiler to the sling rod 32.

After erecting the steel frame stanchion 20, as described hereinbefore, a main-beam attachment beam 34 having the same cross-section formation as the main-beam 26 is attached to the inside of the top portion of the steel frame stanchion 20. The main-beam attachment beam 34 is attached through an attaching plate 36 onto a portion of the interior wall of the stanchion 20. As shown in Fig. 1(A), the projected end portion of the main-beam attachment beam 34 is formed to slant on the skew on the whole, in which the upper end portion forms a longer upright face extension and the lower end portion forms a shorter upright face extension, and the middle end

portion between the upper and lower end portions is formed as a continuously slanted end face cut in a slanting direction. Corresponding to the above formation of the main-beam attachment beam 34, each end of the main-beam 26 in the suspending frame 24 is also formed to slant on the skew on the whole. In converse of the main-beam attachment beam 34, the lower end portion forms a longer upright face extension and the upper end portion forms a shorter upright face extension, and the middle portion between the lower and upper end portions is formed as a continuously slanted end face cut in a slanting direction. As a result, when the suspending-frame main-beam 26 and the main-beam attachment beam 34 are positioned at the same height, the end faces of main-beam 26 and beam 34 can be close butted mutually.

A suspension mechanism 38 for lifting up the suspending frame 24 to which the component blocks of the boiler are assembled and coupled is disposed on the top face of the main-beam attachment beam 34, and suspends a rod (or a wire) 40 to couple the lower end portion of the rod to the suspending frame 24. The rod 40 is suspended to be formed in a wire shape by coupling a plurality of rod units, and has a formation capable of being intermittently lifted up by operation of a jack and suspending the main-beam 26. The suspension mechanism 38 mounted on the main-beam attachment beam 34 performs the operation for hoisting the rod 40 and the operation for suspending boiler component blocks 42 during the assembling work. As a result, as shown in Figs. 1(A) and 1(B), the main-beam 26 of the suspending frame 24 closely approaches the main-beam attachment beam 34 mounted on the top portion of the steel frame stanchion 20, and then a process for coupling and fixing the suspending frame 24 with the main-beam attachment beam 34 is started. In the embodiment, the following emplacing process is employed.

Specifically, after the main-beam 26 closely approaches the main-beam attachment beam 34 mounted on the top end portion of the steel frame stanchion 20, a hydraulic jack means being prepared to be mounted reversibly on an end side portion of the main-beam 20, when a distance

between the two steel frame stanchions 20 is shorter than the attaching length of the main-beam 26, a distance between the steel frame stanchions 20 is adjusted to be enlarged by slidably pushing against both stanchions 20 using a hydraulic jack. In the reverse case, a distance between the steel frame stanchions 20 is adjusted to be contracted by drawing a pair of the steel frame stanchions 20 toward each other by the hydraulic jack. The emplacement to the steel frame stanchions 20 is carried out by switching the operating direction of the hydraulic jack means according to a detected value of the distance for the emplacement between a pair of the steel frame stanchions 20, and conforming the distance between the steel frame stanchions 20 with the length of the main-beam 26. Consequently, when a pair of the steel frame stanchions 20 slant inward or outward, the main-beam 26 is emplaced to the steel frame stanchion 20 concurrently correcting the slant of the stanchions.

For performing the above processes, the main-beam 26 has a hydraulic jack 44 as described above. Additionally, the hydraulic jack 44 is mounted reversibly so that the operating direction thereof can be selected, from either in the direction of the steel frame stanchion 20 or in the opposite direction. The structure has a guide roller 46, as a sliding means, which can be attached in the aforementioned pushing operation against the steel frame stanchion 20 by the hydraulic jack 44, and also, a coupling rod 48, as a coupling means, which can be coupled to the steel frame stanchion 20 in the aforementioned contracting operation by the hydraulic jack 44. On the steel frame stanchion 20, a sliding guide 50 as a sliding means for the guide roller 46 is provided.

The following explanation is relative to a structure for taking steps to couple smoothly through a faceplate after the accurate positioning when the main-beam 26 is lifted up while the steel frame stanchions 20 slanting inward are being pushed and opened up.

Fig. 3 and Fig. 4 are respectively a perspective view and a side elevational view showing a state just before the pushing-opening operation for the steel frame stanchions 20 starts, and which shows one end portion of

the main-beam 26. The main-beam 26 and the attachment beam 34 are each formed of H-beam steel having the same size. Specifically, the attachment beam 34 forms a web with an overhanging state in which the upper flange extends much more than the lower flange, and the main-beam 26 form a web having the reversed shape to be butted against the web of the attachment beam 34. Additionally, both webs have slant portions so that the butting is carried out while the wedging action is created at each web portion. In the embodiment, each web end portion is composed of the upper and lower upright end edges and the slant edge of the middle portion, in which the wedging action is created by joining a mid-slant edge 26Wm of the main-beam 26 to a mid-slant 34Wm of the attachment beam 34.

A jack mounting pedestal 52 is provided on the upper flange portion of the attachment beam 34 secured on the steel frame stanchion 20. The suspension mechanism 38 which is composed of four boiler jacks mounted on the jack mounting pedestal 52, lifts up one end portion of the main-beam 26. To push and open up the steel frame stanchions 20 just before an upper upright edge 26Wu of the above lifted-up main-beam starts contact with an upper upright edge 34Wu of the attachment beam 34, the pushing hydraulic jack 44 is fixed through a fixing base 54 to the upper flange 26Fu of the main-beam 26. The pushing hydraulic jack 44 is disposed so that the rod thereof is extended toward the stanchion 20 and the guide roller 46 is attached to the end of the rod. The guide roller 46 is a slidably moving means including a number of rolling rollers, of which the roller rolling face is oriented toward the attachment beam 34. In this point, the position of roller rolling face is adopted to be in alignment with the upper upright edge 26Wu or project in the pushing direction slightly.

On the other hand, on a portion of the upper upright edge 34Wu of the attachment beam 34, the sliding guide 50 for the guide roller 46 is provided. The sliding guide 50 is formed so that a flat plate is arranged to be flush with a sliced end face of the upper upright edge 34Wu, and composed of a pair of lower guides 50Dr and 50Dl which are respectively disposed at two corner portions formed by the upper upright edge 34Wu and the upper

flange 34Fu, and an upper guide plate 50U extended toward above the upper flange 34Fu. It should be mentioned that each bottom end portion of the lower guides 50Dr and 50Dl slants to overlap a part of the mid-slant 34Wm, thereby facilitating the rolling movement of the guide roller 46 and allowing the smooth emplacement of the main-beam 26. Therefore, when the main-beam 26 is lifted up, just before the upper upright edge 26Wu of the main-beam 26 comes into contact with the upper upright edge 34Wu of the attachment beam 34, the guide roller 46 starts to contact with the sliding guide 50. The position of the rolling face of the guide roller 46 is maintained by the hydraulic jack 44 generating a back pressure of the guide roller 46 so that a distance between a pair of steel frame stanchions 20 is forcibly adjusted to result in a distance defined by the rolling face of the guide roller provided at both end portion of the main-beam 26, namely a distance between the upper upright edges 26Wu of the main-beam 26. As a result, since the distance between a pair of the stanchions 20 is appropriately adjusted so that the main-beam 26 does not interfere with the attachment beam 34, the main-beam 26 can be effortlessly lifted up and carried to the emplacement position, as shown in Fig. 5, with respect to even the stanchion 20 slanted inward by suspending the weight of approximately 2,000 tons.

After being lifted up to the emplacement position, the main-beam 26 is secured to the attachment beam 34 with a faceplate. Lower upright edges 26Wd and 34Wd of webs 26W and 34W of the main-beam 26 and the attachment 34 are mutually joined. Thereafter, the upper upright edges 26Wu and 34Wu in succession to the mid-slant 26Wm and 34Wm are mutually joined respectively, and then the joining between the web faces completes. For the attachment of the faceplate as described above, the web of the main-beam 26 and the web of the attachment beam 34 are required to be in flush with each other.

Allowing for a case where the webs 26W and 34W of the main-beam 26 and the attachment beam 34 are not in flush with each other, in the embodiment, after the main-beam 26 is lifted up to span between a pair of the steel frame stanchions 20 and is aligned in height, the position of the

main-beam 26 in the horizontal direction is determined, using a pair of guide projections 56 provided in the steel frame stanchion 20 and a cylinder means 58, provided on the main-beam 26, for abutting to each side of the parallel walls of the guide projections 56. Thereby, the relative facial deviation between the main-beam 26 and the steel frame stanchion 20 is adjusted, and the attachment of the faceplate to the web edge joining portion is attained. More specifically, as shown in a diagrammatic view of Fig. 1 and the more detailed diagrams of Fig. 6 and Fig. 7, the above adjustment mechanism has a pair of the guide projections 56 formed of H-beam steel which is projected from a side face (face to the main-beam 26) of the boiler jack mounting pedestal 52, in which the guide projections 56 are each disposed at a position equidistant from the web of the attachment beam 34. On the main-beam 26 inserted between a space formed by a pair of the guide projections 56, a pair of the cylinder means 58 for positioning the main-beam 26 in the horizontal direction which is projected toward each of the mutually confronting faces of a pair of the guide projections 56 is provided. Therefore, the main-beam 26 lifted up to the predetermined height position projects the accompanied cylinder 58, thereby the positioning adjustment in the horizontal direction is carried out by a pair of the guide projections 56 provided at the attachment beam 34, resulting in aligning the faces of the joined webs.

As described thus far, where the main-beam 26 for lifting up the boiler component blocks is lifted up between a pair of the steel frame stanchions 20 and butted and fixed to the top portion of the steel frame stanchions 20, the main-beam 26 can be emplaced to the steel frame stanchions 20 while the inward slant of the stanchions 20 is corrected in the manner that, the main-beam 26 is lifted up while the distance between a pair of the stanchions 20 is pushed and opened up by means of the pushing and slidably moving means composed of the hydraulic jack 44 and the guide roller 46, which are provided on the main-beam 26, in the moving process of the main-beam 26 to the emplacement position to the steel frame stanchions 20. Concurrently, after the positioning adjustment in the height direction, the slide cylinder means 58 of the main-beam 26 is extended to abut to a pair

of the guide projections 56 provided at the attachment beam 34, thereby performing the positioning adjustment in the horizontal direction. As a result, the proper positioning and centering adjustment of the main-beam 26 with respect to the attachment beam 34 can be attained.

On the other hand, when the main-beam 26 is lifted up, the steel frame stanchions 20 are not always slanted inward. The slant direction of the stanchion 20 differs depending on the attaching position of the boiler jack (38) for lifting up the main-beam. In the embodiment, allowing for a case that the steel frame stanchion 20 slants outward, the hydraulic jack provided on the side end portion of the main-beam 26 is attached reversibly. Thus, when a distance between the steel frame stanchions 20 is longer than the emplacing length of the main-beam 26, a distance adjustment is carried out by drawing-in the stanchion by the hydraulic jack 44. Since a point of application and a load value of the boiler are known in advance, the slant direction and the slant degree can be calculated. Therefore, the mounted direction of the hydraulic jack 44 is shifted in advance in accordance with the detection calculated values. Fig. 8 and Fig. 9 shows a state in which the hydraulic jack 44 is attached in reverse to draw in the steel frame stanchion 20 to the end face side of the main-beam 26. The coupling rod side is adopted to orient toward the center of the main-beam with respect to the fixing based 54 of the hydraulic jack 44, and providing a slider 60 interlocking with the extension of the coupling rod, the coupling rod 48 links the slider 60 to the boiler jack mounting pedestal 52. Thus, the extended rod draws in the attachment beam 34 through the slider 60 and the coupling rod 48 to the end face side of the main-beam 26 by operating the hydraulic jack 44 so that the attachment beam 34 and the main-beam 26 approaches to obviate a gap therebetween. Consequently, even when a pair of the steel frame stanchions 20 slant outward, the distance between the stanchions 20 is adjusted to be proper for the emplacement of the main-beam, and the centering process of the existing stanchion structure and the main-beam 26 to be emplaced is extremely precisely carried out. The time of an emplacement process, namely the faceplate attachment process for the main-beam 26 is

substantially shorter than the conventional art.



WHAT IS CLAIMED IS:

1. A construction method of emplacing main-beam in which a main-beam suspending a subject is lifted up between a pair of stanchion structures and fixed to each top portion of the stanchion structures, wherein the stanchion structure is prevented from slanting inward by lifting up and moving the main-beam while a distance between a pair of the stanchion structures is pushed and enlarged by a pressing and slidably-moving means provided on the main-beam, in a moving process of the main-beam toward the emplacement position to the stanchion structure so that the main-beam is emplaced to the stanchion structure.
2. A construction method of emplacing main-beam in which a main-beam suspending a subject is lifted up between a pair of stanchion structures and butted against each top portion of the stanchion structures, comprising a step of adjusting a distance between a pair of the stanchion structures to conform with a length of the main-beam by a drawing-in means for drawing each stanchion structures toward the main-beam, at an emplacement position of the main-beam to the stanchion structure so that the main-beam is emplaced to the stanchion structures.
3. A construction method of emplacing main-beam in which a main-beam suspending a subject is lifted up between a pair of stanchion structures and butted against each top portion of the stanchion structures, comprising the steps of:
 - mounting a hydraulic jack means on a side end portion of the main-beam to reverse the mounted direction of the hydraulic jack;
 - shifting the mounted direction of the hydraulic jack means in accordance with a detected value of an emplacement distance between a pair of the stanchion structures to push against and slide on the stanchion by the hydraulic jack means when the distance between a pair of the stanchion structures is shorter than an emplacement length of the main-beam, and to



draw the stanchion structure toward the main-beam by the hydraulic jack means when the distance between a pair of the stanchion structures is longer than an emplacement length of the main-beam; and

conforming the distance between a pair of the stanchion structures with the length of the main-beam so that the main-beam is emplaced to the stanchion structures.

4. The construction method of emplacing the main-beam according to any one of claim 1 to 3, wherein after the main-beam is lifted up and spanned between a pair of the stanchion structures, a relative facial deviation between the main-beam and the stanchion structure is adjusted by a guide space, provided at one of the stanchion structure and the main-beam, and an abutting means, provided at the other of the stanchion structure and the main-beam, for abutting onto each of parallel walls of the guide space, so that a faceplate is attached to a butting portion of the stanchion structure and the main-beam.

5. A centering adjustment apparatus for a main-beam in which a main-beam suspending a subject is lifted up between a pair of stanchion structures and butted against each top portion of the stanchion structures, comprising:

a hydraulic jack mounted on the main-beam to reverse the mounted direction;

a sliding means attached in a pushing operation against the stanchion structure by said hydraulic jack;

a coupling means for coupling to the stanchion structure in a drawing operation performed by said hydraulic jack; and

a sliding guide, provided at the stanchion structure, for said sliding means.

6. The centering adjustment apparatus for the main-beam according to claim 5, further comprising:

a guide space provided at one of the stanchion structure and the



main-beam; and

an extending means, provided at the other of the stanchion structure and the main-beam, for extending onto each of the parallel walls of said guide space, so that a relative facial deviation between the main-beam and the stanchion structure is adjusted by the abutting action of said extending means to said guide space.