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Une et al.

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[54] **HYDRAULIC JIG FOR CORRECTION OF MIS-ALIGNMENT BETWEEN JOINTS OF PLATES**

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[52] **U.S. Cl.**..... **29/200 P**

[51] **Int. Cl.**..... **B23p 19/00**

[58] **Field of Search**..... 29/200 P, 200 J, 29/200 R, 200 A, 203 P, 203 R

[56] **References Cited**

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Primary Examiner—Thomas H. Eager

Attorney—Scrivener Parker Scrivener & Clarke

[57] **ABSTRACT**

A hydraulic jig for aligning plates edge-to-edge prior to welding provided with a first hydraulic jack for clamping a first plate having a width within a predetermined range in the direction of its width and thickness and also provided with hydraulic jacks for exerting pressure to a second plate in the direction of its width and thickness.

2 Claims, 7 Drawing Figures

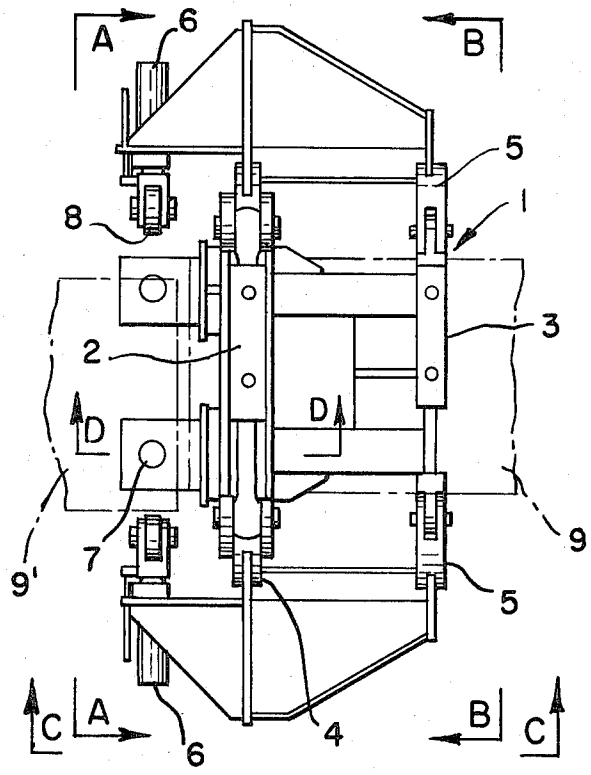


Fig. 1

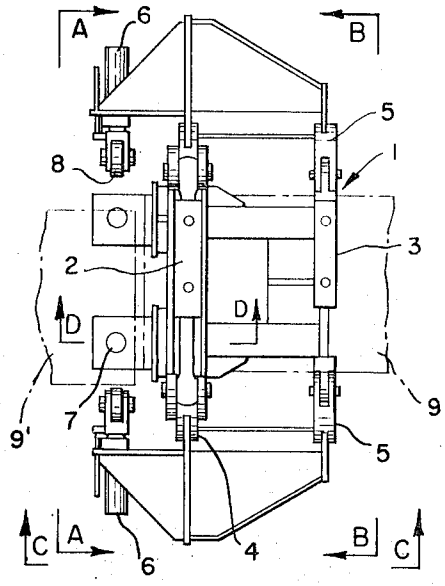


Fig. 2

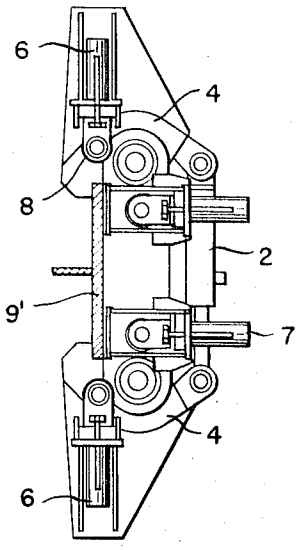


Fig. 4

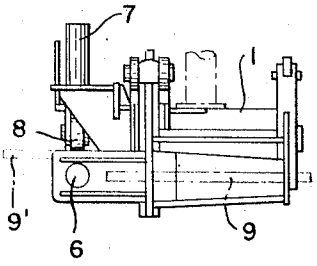
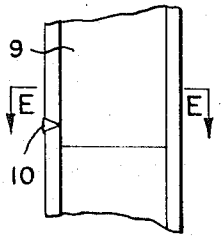


Fig. 6



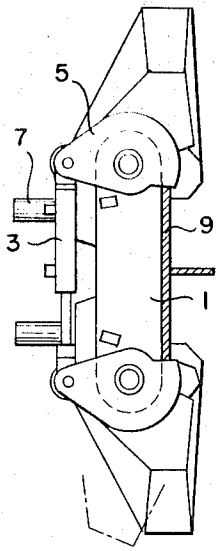


Fig. 3

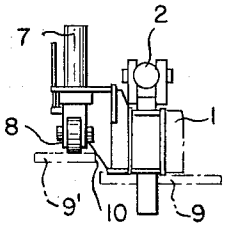


Fig. 5

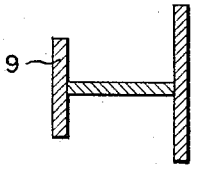


Fig. 7

HYDRAULIC JIG FOR CORRECTION OF MIS-ALIGNMENT BETWEEN JOINTS OF PLATES

Recently larger and larger vessels are constructed so that the prior art manual operation for welding the shell blocks or subassemblies becomes extremely difficult.

In the prior art method, a large quantity of mis-alignment correction pieces are used, and erection is made by use of hammers and wedges.

The defects of the prior art method are that a large quantity of materials and much cost are required; a long time is required for attaching the pieces; the consumption of welding rods and electric power is increased; and the spots at which the pieces are attached must be finished after welding.

The present invention was made to overcome these defects of the prior art method, and provides a hydraulic jig for correction of mis-alignment between joints of plates characterized in that a jig proper of said jig has a hydraulic jack for clamping the first plate having a width within a predetermined range in the direction of its width and thickness, a hydraulic jack for clamping the first plate only in the direction of its width, a pair of hydraulic jacks for exerting the pressures to the second plate in the direction of its width, and a pair of hydraulic jacks for exerting the pressures to the second plate in the direction of its thickness.

The present invention will become more apparent from the following description of the preferred embodiment thereof taken in conjunction with the accompanying drawing.

FIG. 1 is a top view of a jig in accordance with the present invention;

FIG. 2 is a side view thereof looking in the direction indicated by the arrows A of FIG. 1;

FIG. 3 is a side view thereof looking in the direction indicated by the arrows B of FIG. 1;

FIG. 4 is a front view looking in the direction of the arrows C of FIG. 1;

FIG. 5 is a sectional view thereof taken along the line D—D of FIG. 1;

FIG. 6 is a fragmentary trasverse sectional view of a transverse frame of a vessel; and

FIG. 7 is a sectional view taken along the line E—E of FIG. 6.

A 15-ton hydraulic jack for clamping and a 5-ton hydraulic jack also for clamping are mounted in parallel with each other on a jig proper 1 in the axial direction thereof. Clamp memers 4 whose ends are so formed as to clamp plates in the directions of their width and thickness as shown in FIG. 2 are symmetrically and rotatably fixed to the jig proper 1. As shown in FIG. 3, similar clamp members 5 whose leading ends are so formed as to clamp the plates in the direction of their width are pivoted to the jig proper 1. The other ends of the clamp members 4 are pivoted to the hydraulic jack 2, and the other ends of the clamp members 5 are pivoted to the hydraulic jack 3 so that the clamp members 4 and 5 are opened or closed as the hydraulic jacks 2 and 3 are actuated. A pair of 10-ton hydraulic jacks 6 for alignment between the lateral surfaces of the plates are symmetrically fixed to the jig proper 1 and are provided with rollers 8 so that the plates may be exerted with the pressures in the direction of their width. A pair of vertically-spaced-apart 10-ton hydraulic jacks 7 having rollers 8 at their lower ends are also disposed to the jig proper 1 for exerting the pressures to the plates in

the direction of their thickness for alignment therebetween in the longitudinal direction thereof. By these hydraulic jacks 6, 7, 2 and 3, the mis-alignment in the longitudinal and lateral directions of the face plates 9 and 9′ can be corrected. Reference numeral 10 designates the joint (to be welded) of the face plate.

Next the mode of operation will be described when the jig of the present invention is used to align the face plates 9 and 9′ of the transverse frames in a vessel under construction as shown in FIGS. 6 and 7.

To correct mis-alignment between the joints of the face plates 9 and 9′ as shown in FIG. 1, the jig of the present invention is set to the joints 10. Next the hydraulic jack 2 is extended to clamp the face plate 9 in the directions of its width and thickness with the clamp members 4 as shown in FIG. 2. The hydraulic jack 3 is actuated to clamp the face plate 9 in the direction of its width with the clamp members 5 as shown in FIG. 3. Next the hydraulic jacks 6 and 7 are actuated to correct the mis-alignment in the lateral and longitudinal directions of the face plate 9′ respectively. Thereafter, the tack welding is made, and the two face plates 9 and 9′ are welded together. Since the rollers 8 are attached to the ends of the hydraulic jacks 6 and 7, no lateral and eccentric loads are exerted to the hydraulic jacks 6 and 7. Either of the hydraulic jacks 6 or 7 may be actuated first.

In the embodiment described above, the jig of the present invention has been described as being applied to the joints of the face plates of the transverse frame in the vessel under construction, but it should be understood that the present invention is not limited only to the ship-building in application. The present invention may be also used for correction of mis-alignments between the joints of face plates to be tack-and-joint-welded in any other structure. Furthermore the present invention is not limited to that illustrated in the accompanying drawing.

As described above, the jig of the present invention has the hydraulic jack for clamping a plate having a width less than a predetermined width in the directions of its width and thickness, the hydraulic jack for clamping the plate only in the direction of its width, the hydraulic jacks for exerting the pressures to the plate in the direction of its width; and the hydraulic jacks for exerting the pressures to the plate in the direction of its thickness. Therefore, correction of mis-alignment between the joints of face plates can be accomplished in a simple manner without the use of mis-alignment correction pieces. Thus the defects encountered in the prior art method can be overcomed, and the operation can be accomplished in a short time in a simple, efficient and safeguarded manner.

We claim:

1. A jig for aligning plates edge-to-edge prior to welding, having attached thereto: a first hydraulic jack equipped with means for securing a first plate in relation to the jig by gripping it across its width and across its thickness; a second hydraulic jack spaced from the first and equipped with means for securing said first plate in relation to the jig by gripping it across its width only; a first pair of hydraulic jacks for exerting pressure upon a second plate across its width and hence being about its movement in relation to the jig into a desired alignment with said first plate; and a second pair of hydraulic jacks for exerting pressure upon said second plate in the direction of its thickness and hence bring

about its movement in relation to the jig and hence into a desired alignment with said first plate.

2. A hydraulic jig for correction and mis-alignment between joints of plates according to claim 1 wherein rollers for exerting the pressure to the second plate are respectively attached to the ends of the hydraulic jacks

for exerting the pressure to the second plate in the direction of its width and the ends of the hydraulic jacks for exerting the pressure to the second plate in the direction of its thickness.

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