

PATENT SPECIFICATION

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 (72) Inventor KAZUO MAEDA



(54) APPARATUS FOR ALIGNING WORKPIECES

(71) We, MITSUI SHIPBUILDING AND ENGINEERING CO. LTD., a Corporation organized under Japanese Law, of 6-4 Tsukiji, 5-chome, Chuoku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which is to be performed, to be particularly described in and by the following statement:—

The present invention relates to an apparatus for aligning workpieces end-to-end, for example hull modules used in ship-building.

According to this invention there is provided apparatus for aligning workpieces end-to-end and including a body member having an anvil member providing a pair of elongate surfaces arranged at an angle to each other transversely to their lengths for spanning two workpieces to be aligned, and pressure applying means mounted on the body member and arranged to apply forces towards each of said surfaces at two positions on each of said surfaces that are spaced longitudinally relative to said surfaces, so that when adjacent ends of the workpieces to be aligned are positioned between said spaced positions and the workpieces are positioned between said anvil member and said pressure-applying means said pressure-applying means can be operated to urge said workpieces into contact with said surfaces whereby alignment of the workpieces is achieved.

A preferred embodiment of the invention will now be described with reference to the accompanying drawing wherein:—

Fig 1 is a perspective view of apparatus embodying the present invention;

Fig 2 is a side view of the apparatus shown in Fig 1; and

Fig 3 is a sectional view taken along the line III—III in Fig 2.

In the drawings numerals 1 and 2 designate hull modules to be welded to each other, and 3 and 4 designate longitudinal members each of which has an L-shaped cross-section and which are to be aligned end-to-end to be welded together.

A body member 5 includes an L-sectioned support portion 6 which spans said members 3, 4 and provides elongate surfaces under the members 3 and 4. Opposite one side of the support portion 6 is a pair of horizontal hydraulic rams 7, 8 which are so spaced that pressing plates 10 carried at the ends of their respective piston rods can abut against end faces of the respective longitudinal members 3 and 4. There is also mounted on the body member a pair of vertical hydraulic rams 11, 12. The ends of their respective piston rods are secured to the ends of first order levers 13, 14 whose fulcra are provided by the upper ends of a pair of arms 15 pivotably mounted on the body member. Carried at other ends of the levers 13, 14 are pressing plates 16 arranged to abut on upper faces of the respective longitudinal members 3, 4.

To align the longitudinal members the support portion 6 is placed under the longitudinal members 3, 4 and then the pressing plates 10 are positioned in abutment against the respective longitudinal members to press them against the support portion 6 by using the horizontal hydraulic rams 7, 8. Also, the levers 13, 14 are pivoted by the vertical hydraulic rams 11, 12 to urge the pressing plates 16 against the respective longitudinal members thereby forcing them against the support portion 6. Thus the longitudinal members are urged into precise end-to-end alignment. After completing this alignment, the aligning apparatus is detached and then the welding operation is carried out.

Clearly the alignment of T-shaped cross-section members can also be carried out using the apparatus described above.

WHAT WE CLAIM IS:—

1. Apparatus for aligning workpieces end-to end and including a body member having an anvil member providing a pair of elongate surfaces arranged at an angle to each other transversely to their lengths for spanning two workpieces to be aligned, and pressure-applying means mounted on the body

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The present invention relates to an apparatus for aligning workpieces end-to-end, for example hull modules used in ship-building.

According to this invention there is provided apparatus for aligning workpieces end-to-end and including a body member having an anvil member providing a pair of elongate surfaces arranged at an angle to each other transversely to their lengths for spanning two workpieces to be aligned, and pressure applying means mounted on the body member and arranged to apply forces towards each of said surfaces at two positions on each of said surfaces that are spaced longitudinally relative to said surfaces, so that when adjacent ends of the workpieces to be aligned are positioned between said spaced positions and the workpieces are positioned between said anvil member and said pressure-applying means said pressure-applying means can be operated to urge said workpieces into contact with said surfaces whereby alignment of the workpieces is achieved.

A preferred embodiment of the invention will now be described with reference to the accompanying drawing wherein:—

Fig 1 is a perspective view of apparatus embodying the present invention;

Fig 2 is a side view of the apparatus shown in Fig 1; and

Fig 3 is a sectional view taken along the line III—III in Fig 2.

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A body member 5 includes an L-sectioned support portion 6 which spans said members 3, 4 and provides elongate surfaces under the members 3 and 4. Opposite one side of the support portion 6 is a pair of horizontal hydraulic rams 7, 8 which are so spaced that pressing plates 10 carried at the ends of their respective piston rods can abut against end faces of the respective longitudinal members 3 and 4. There is also mounted on the body member a pair of vertical hydraulic rams 11, 12. The ends of their respective piston rods are secured to the ends of first order levers 13, 14 whose fulcras are provided by the upper ends of a pair of arms 15 pivotably mounted on the body member. Carried at other ends of the levers 13, 14 are pressing plates 16 arranged to abut on upper faces of the respective longitudinal members 3, 4.

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Clearly the alignment of T-shaped cross-section members can also be carried out using the apparatus described above.

WHAT WE CLAIM IS:—

1. Apparatus for aligning workpieces end-to-end and including a body member having an anvil member providing a pair of elongate surfaces arranged at an angle to each other transversely to their lengths for spanning two workpieces to be aligned, and pressure-applying means mounted on the body



member and arranged to apply forces towards each of said surfaces at two positions on each of said surfaces that are spaced longitudinally relative to said surfaces, so that when adjacent ends of the workpieces to be aligned are positioned between said spaced positions and the workpieces are positioned between said anvil member and said pressure-applying means, said pressure-applying means can be operated to urge said workpieces into contact with said surfaces whereby alignment of the workpieces is achieved.

2. Apparatus according to claim 1 wherein the pressure-applying means for urging workpieces into contact with one of said surfaces include first order levers linking urging means to respective contacting members for applying pressure to the workpiece.

3. Apparatus according to claim 2 wherein the fulcrum for each said first order lever is provided by a pivotal connection to a link

pivotably mounted on the body member

4. Apparatus according to any one of the preceding claims wherein urging means of said pressure-applying means are mounted at one side of the body member and said anvil member is provided by a portion of the body member at the side of the latter opposite said one side.

5. Apparatus according to any one of the preceding claims wherein said pressure-applying means include pressure-actuated rams.

6. Apparatus for aligning workpieces end-to-end and substantially as described herein with reference to the accompanying drawing.

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