

Description

Title of Invention: A SAW-TEETH TYPE HYDRAULIC JACK

Technical Field

- [1] The present invention relates to a saw-teeth type hydraulic jack and, more particularly, to a saw-teeth type hydraulic jack which holds a work piece to prevent the deformation. According to the present invention, it is possible to hold the work piece trying to deform along the circular arc to compensate for the deformation. Mainly, however not limited thereto, the present invention is applied to a welding piece trying to deform by heat generated during the welding and keeps the position of the welding piece properly.

Background Art

- [2] For example, when welding a steel plate which stands upright on a base, the steel plate experiences thermal deformation and the welding position is not kept properly and deviated from the originally intended position.
- [3] To prevent this, a turnbuckle is generally used. That is, the turnbuckle is placed between the steel plate which stands upright and the base so that the turnbuckle supports the steel plate to prevent the deformation. However, in this case, the plate deforms along the circular arc and it is not possible for the turnbuckle to support the steel plate correspondingly against the deformation. Accordingly, the steel plate deviates from the welding position on the joining surface. Also, the turnbuckle applies a large force on the base and causes a scar like a dent on the base. This scar cannot be hid by a painting and causes an aesthetic problem.
- [4] Therefore, it is necessary to provide a holder which can hold the work piece to compensate for the deformation correspondingly so that the position of the work piece is properly maintained. Also, it is necessary to provide a holder which can prevent the scar on the base. The present invention satisfies these demands.

Disclosure of Invention

Technical Problem

- [5] The purpose of the present invention is to provide a saw-teeth type hydraulic jack which can hold a work piece correspondingly to the deformation. Also, the present invention provides a saw-teeth type hydraulic jack which can prevent the scar on the base. Mainly, not limited thereto, the present invention is directed to prevent the deformation of a welding piece to which welding is performed, the deformation caused by heat generated during the welding.

Solution to Problem

- [6] The present invention provides a saw-teeth type hydraulic jack comprising: a

cylinder body in which a hydraulic pressure room is provided; a spool valve mounted on the hydraulic pressure room; a movable holding member connected with a rod of the spool valve and protruding externally from the cylinder body, the movable holding member having a plurality of teeth formed on its end in the externally protrusion direction, wherein a line connecting the ends of the teeth forms a circular arc; an opposite holding member protruding externally from the cylinder body at the opposite to the movable holding member, the opposite holding member having a plurality of teeth formed on its end in the externally protrusion direction, wherein a line connecting the ends of the teeth forms a circular arc; wherein the circular arcs formed by the plural teeth of the movable holding member and the opposite holding member are symmetrical to each other; and a stand to stand the cylinder body to be inclined to a base.

- [7] According to the present invention, it is preferable if the opposite holding member is fixed to the cylinder body.
- [8] According to the present invention, it is preferable if the teeth formed on the movable holding member and the opposite holding member have a shape of saw-teeth.
- [9] According to the present invention, it is preferable if the cylinder body is provided with a hydraulic nipple through which hydraulic pressure is supplied.
- [10] According to the present invention, it is preferable if a spring is provided in the hydraulic pressure room for accumulating a restoring force against the expansion of the spool valve.

Advantageous Effects of Invention

- [11] The present invention provides the saw-teeth type hydraulic jack which can hold a work piece such as a welding piece correspondingly to the deformation. Also, present invention provides the saw-teeth type hydraulic jack which can prevent a big scar on a base.

Brief Description of Drawings

- [12] Figs. 1 and 2 are perspective views of a saw-teeth type hydraulic jack according to an embodiment of the present invention;
- [13] Fig. 3 is a sectional view of the saw-teeth type hydraulic jack showing the inside structure thereof;
- [14] Figs. 4 and 5 show a work of the saw-teeth type hydraulic jack according to the embodiment of the present invention;
- [15] Figs. 6 and 7 show the saw-teeth type hydraulic jack on which a hand pump is mounted.

Best Mode for Carrying out the Invention

- [16] Now, a preferred embodiment of the present invention is explained with reference to attached drawings.

- [17] Figs. 1 and 2 are perspective views of a saw-teeth type hydraulic jack 1000 according to the embodiment of the present invention. Fig. 3 is a sectional view of the saw-teeth type hydraulic jack 1000 showing the inside structure thereof, wherein a stand 10 is not viewed.
- [18] With reference to Figs. 1 to 3, the saw-teeth type hydraulic jack 1000 has a cylinder body 100 in which a hydraulic pressure room 300 is formed.
- [19] A spool valve 500 is mounted on the hydraulic pressure room 300 in the cylinder body 100. A passage way 180 is formed on a side of the cylinder body 100 and a hydraulic nipple 80 is mounted on the passage way 180 as shown. The passage way 180 communicates with an external.
- [20] Accordingly, it is possible to supply a hydraulic pressure to the hydraulic room 300 from a hydraulic pump (not shown). For example, if a coupler is mounted on the end of a hose of the hydraulic pump and is coupled with the nipple 80, the hydraulic pressure is supplied to the hydraulic room 300. The spool valve 500 will move to left if the hydraulic pressure is supplied.
- [21] In this embodiment, the cylinder body 100 is divided into two parts 110 and 130 and they are coupled with each other. For example, they can be coupled by bolts. (not shown)
- [22] A ring 470 is provided around the spool of the spool valve 500 along the circumference thereof.
- [23] The left side of the cylinder body 100 is open and a rod 540 of the spool valve 500 is externally protruded and a movable holding member 40 is coupled with the rod 540. In this embodiment, a haft 48 of the movable holding member 40 is inserted into the rod 540 and the bolts 91 and 93 bolt the rod 540 and the movable holding member 40.
- [24] In the spool valve 500, a cavity part 350 is formed on the side of the passage way 180. In the right side of the cavity part 350, a first spring holding member 410 is provided. The first spring holding member 410 is combined with the inside of the cylinder body 100 through a bolt 430. In the left side of the cavity part 350, a second spring holding member 420 is provided. The second spring member 420 is combined with the rod 540 of the spool valve 500 through a bolt 450. A spring 88 is mounted across the spring holding members 410 and 420.
- [25] Accordingly, if the spool valve 500 moves to the left, the spring 88 is extended to the left and accumulates a restoring force.
- [26] If the hydraulic pressure is supplied from the hydraulic pump through the nipple 80, the hydraulic pressure runs into the hydraulic pressure room 300 through the passage way 180 and moves the spool valve 500 to the left so that the movable holding member 40 moves to the left.
- [27] Reversely, if the hydraulic pressure runs out from the hydraulic pressure room 300,

the movable holding member 40 moves to the right by the restoring force of the spring 88 and returns to the original position.

[28] According to the present invention, a plurality of teeth 41 is formed on the end of the movable holding member 40 in the externally protrusion direction. The teeth 41 have a shape of saw-teeth and a line connecting the ends of the teeth 41 forms a circular arc.

[29] That is, with reference to Fig. 3, the line connecting the ends of the plural teeth 41 of the movable holding member 40 runs along the same radius R1 and forms a circular arc S1.

[30] In the cylinder body 100, at the opposite side of the movable holding member 40, an opposite holding member 60 is protruded. The opposite holding member 60 may be fixed to the cylinder body 100. In this embodiment, the opposite holding member 60 is inserted into the side of the cylinder body 100 and bolts 92 and 94 bolt the cylinder body 100 and the opposite holding member 60.

[31] A plurality of teeth 61 is formed on the end of the opposite holding member 60 in the externally protrusion direction. The teeth 61 have a shape of saw-teeth and a line connecting the ends of the plural teeth 61 forms a circular arc.

[32] With reference to Fig. 3, the line connecting the ends of the plural teeth 61 of the opposite holding member 60 runs along the same radius R2 and forms a circular arc S2.

[33] The circular arcs S1 and S2 formed by the plural teeth 41 and 61 of the movable holding member 40 and the opposite holding member 60 are symmetrical to each other.

[34] On the lower part of the cylinder body 100, a stand 10 is provided to stand the cylinder body 100 to be inclined to a base.

[35] With reference to Figs. 4 and 5, the work of the saw-teeth type hydraulic jack 1000 according to the embodiment of the present invention is explained.

[36] Firstly, a steel plate 900 standing upright is placed between a ceiling T and the base B and the saw-teeth type hydraulic jack 1000 is placed between the steel plate 900 and the base B as the cylinder body 100 is inclined. The hydraulic pump (not shown) is connected through the nipple 80. A coupler on the end of the hose of the hydraulic pump is inserted into the nipple 80 and coupled therewith.

[37] In this situation, a welding is performed at a position A on the ceiling T.

[38] In this case, the steel plate 900 is trying to deform to rotate around the position A along the direction D1 by heat generated by the welding. The hydraulic pressure is supplied to the saw-teeth type hydraulic jack 1000 and the movable holding member 40 moves toward the base B and, accordingly, the opposite holding member 40 moves toward the steel plate 900. (Fig. 4)

[39] The lines connecting the ends of the plural teeth of the movable holding member 40

and the opposite holding member 60 take the circular arcs S1 and S2 symmetrical to each other.

[40] The plural teeth 41 of the movable holding member 40 are sequentially driven into the base B along the circular arc S1 and, correspondingly, the teeth 61 of the opposite holding member 60 sequentially push the steel plate 900 along the circular arc S2. (Fig. 5)

[41] The trace formed as the teeth 61 of the opposite holding member 60 push the steel plate 900 follows the direction D2 reverse to the direction D1 and it corresponds to the deformation or, at least, approximates to the deformation so that the steel plate 900 returns back to the original position.

[42] The steel plate 900 keeps the original position in this way and a welding for the position B on the base is performed.

[43] When the saw-teeth type hydraulic jack 1000 holds the steel plate 900, which is the welding piece, the teeth 41 of the movable holding member 40 is stuck into the base B. However, in this case, the scar thereon is very minimal compared to that occurring when the turnbuckle is used and it may be hid by a painting thereon.

[44] Figs. 5 and 6 show the saw-teeth type hydraulic jack 1000 on which a hand pump 5000 is mounted.

[45] In this case, if a hand 944 of the hand pump 5000 moves up and down, a pumping piston 908 repeatedly moves up and down and check valves 910 and 930 on the both sides of the lower part of the pumping piston 908 is reciprocally opened and closed to run out the hydraulic pressure in an oil tank 980 so that the hydraulic pressure is supplied to the hydraulic pressure room 300 in the cylinder body 100 through the passage way 180.

Industrial Applicability

[46] As described above, the present invention provides the saw-teeth type hydraulic jack which can hold a work piece correspondingly to the deformation and prevent a big scar on the base.

[47] The saw-teeth type hydraulic jack according to the present invention is mainly applicable to the welding, however, it should be understood that it is not limited thereto.

[48] Now, it is understood that the purpose of the present invention is accomplished. The present invention is described with reference to the specific embodiments, but the invention is not limited there to. Only the following claims will determine the scope of the invention.

Claims

- [Claim 1] A saw-teeth type hydraulic jack comprising:
- (a) a cylinder body in which a hydraulic pressure room is provided;
 - (b) a spool valve mounted on the hydraulic pressure room;
 - (c) a movable holding member connected with a rod of the spool valve and protruding externally from the cylinder body, the movable holding member having a plurality of teeth formed on its end in the externally protrusion direction, wherein a line connecting the ends of the teeth forms a circular arc;
 - (d) an opposite holding member protruding externally from the cylinder body at the opposite to the movable holding member, the opposite holding member having a plurality of teeth formed on its end in the externally protrusion direction, wherein a line connecting the ends of the teeth forms a circular arc; wherein the circular arcs formed by the plural teeth of the movable holding member and the opposite holding member are symmetrical to each other; and
 - (e) a stand to stand the cylinder body to be inclined to a base.
- [Claim 2] The saw-teeth type hydraulic jack as recited in claim 1 wherein the opposite holding member is fixed to the cylinder body.
- [Claim 3] The saw-teeth type hydraulic jack as recited in claim 1 or 2 wherein the teeth formed on the movable holding member and the opposite holding member have a shape of saw -teeth.
- [Claim 4] The saw-teeth type hydraulic jack as recited in claim 3 wherein the cylinder body is provided with a hydraulic nipple through which hydraulic pressure is supplied.
- [Claim 5] The saw-teeth type hydraulic jack as recited in claim 4 wherein a spring is provided in the hydraulic pressure room for accumulating a restoring force against the expansion of the spool valve.