

[54] **ARRANGEMENT FOR ALIGNING
TUBULAR SECTIONS FOR FABRICATION**

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[56] **References Cited**

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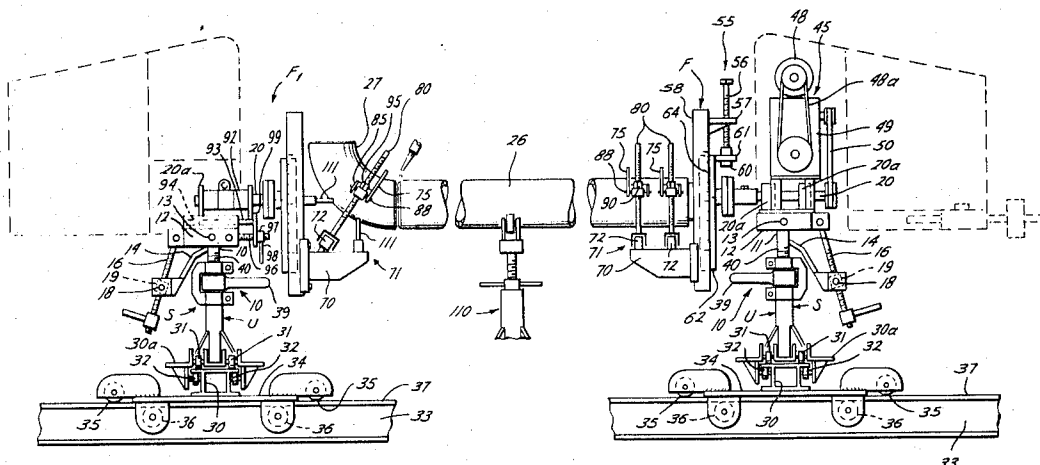
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[57] **ABSTRACT**

A pair of upright structures in spaced relation to each other is provided with means for elevating and lowering each of the structures, means for pivoting the upper part of the structure so that it may be tilted upwardly or downwardly, and adjustable means are carried by the upper part of the structure for supporting a tubular section so that the tubular section carried by each of the upright structures may be aligned and connected together. At least one of the upright structures is provided with power means for rotating the supported tubular structure.

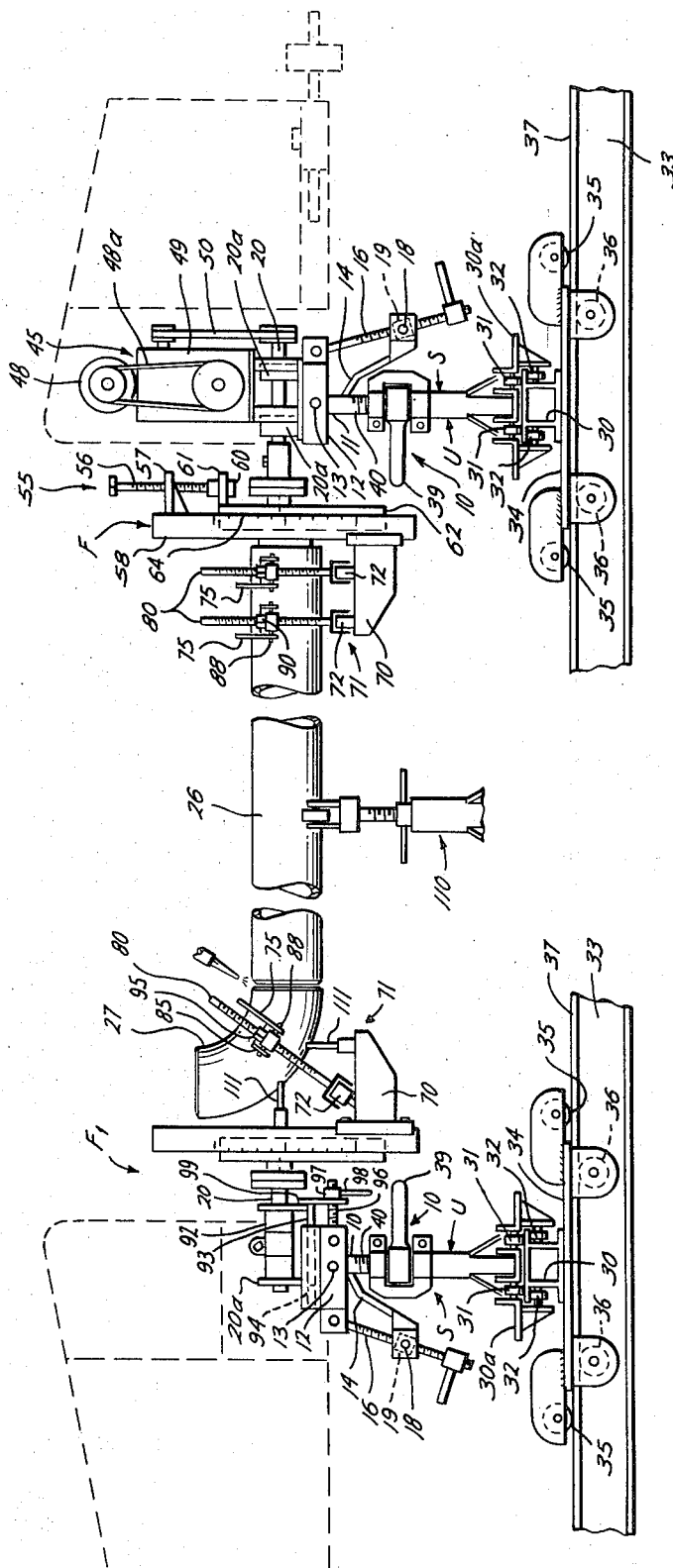
6 Claims, 3 Drawing Figures



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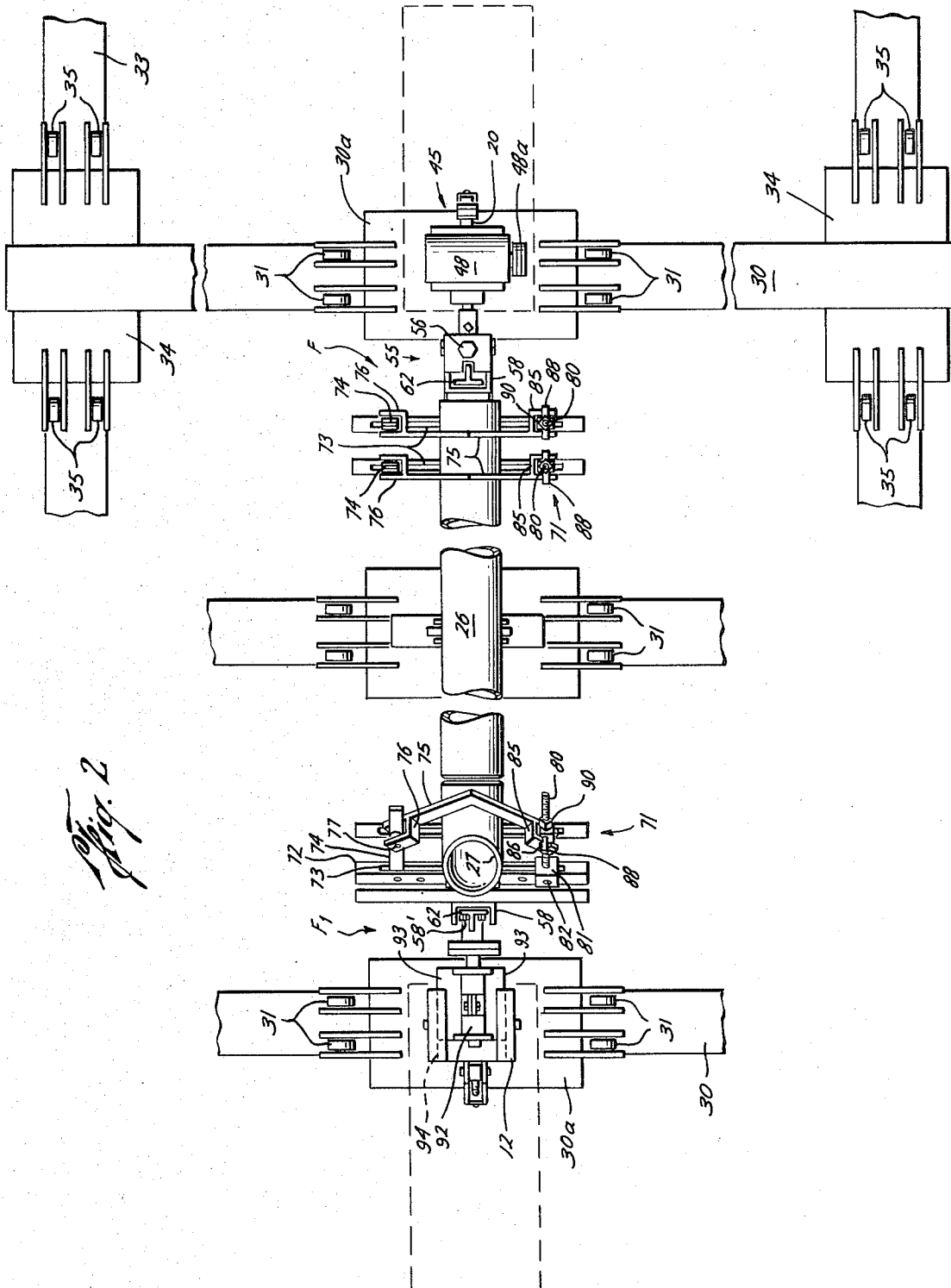
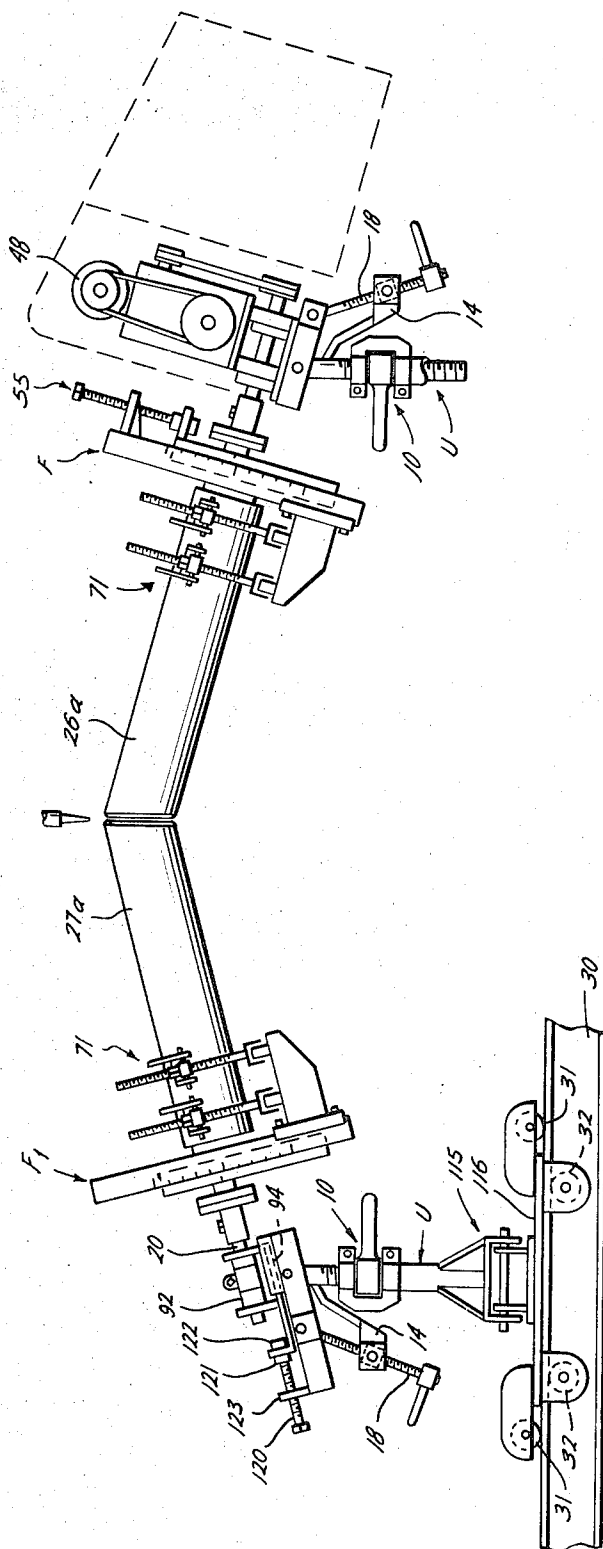


Fig. 2

Fig. 3



ARRANGEMENT FOR ALIGNING TUBULAR SECTIONS FOR FABRICATION

BACKGROUND OF THE INVENTION

In the fabrication of tubular sections, it is necessary to connect not only straight sections of tubular sections, but straight sections with elbows or T's, or to connect tubular sections at angles relative to each other. At the present time, alignment of the tubular sections to be connected is difficult, and not only is the initial alignment difficult, but it is difficult to maintain the proper alignment as the two sections are connected together by welding or the like.

The present invention overcomes these difficulties in that it provides an arrangement for quickly and easily aligning tubular sections which are to be connected together and for maintaining them in a predetermined alignment as their ends are connected.

An object of the present invention is to provide an arrangement for connecting tubular sections together including a pair of upright structures which are provided with means for elevating each of the structures, means for tilting each of the upper structures at their upper ends, and adjustable means supported by the upper end of each of the structures for carrying a tubular section.

Another object of the present invention is to provide an arrangement for connecting tubular sections together including a pair of upright structures which are provided with means for elevating each of the structures, means for tilting each of the upper structures at their upper ends, and adjustable means supported by the upper end of each of the structures for carrying a tubular section, with at least one of the upright structures including means for rotating the tubular structure carried thereby.

Still another object of the present invention is to provide an arrangement for connecting tubular sections together including upright structures with means for raising and lowering the upright structures, means for tilting the upper end of the upright structures at an angle, shaft means rotatably supported by the upper end of the upright structures with an adjustable frame thereon for supporting a tubular section.

Yet another object of the present invention is to provide an arrangement for connecting tubular sections together including upright structures with means for raising and lowering the upright structures, means for tilting the upper end of the upright structures at an angle, shaft means rotatably supported by the upper end of the upright structures with an adjustable frame thereon for supporting a tubular section, with at least one of the upright structures including power means for rotating the rotatable means and tubular section supported by the frame.

Other objects and advantages of the invention will become more apparent from a consideration of the following drawings and description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view illustrating the pair of upright structures with tubular sections engaged thereon and aligned for connection;

FIG. 2 is a top plan view of FIG. 1; and

FIG. 3 illustrates an alternate embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Attention is first directed to FIG. 1 wherein a pair of upright structures is represented by the letter U. Each structure U includes vertically extending shaft means generally represented by the letter S, with each shaft means including any suitable form of jack means such as that illustrated generally at 10.

The upper end 11 of each shaft 10 is provided with support means 12. The support means 12 may be in the form of a horizontally extending plate and is pivotally connected at 13 to the upper end 11 of the shaft means 10 to enable the support means 12 of each shaft means 10 to tilt in either direction relative to the longitudinal axis of the shaft means 10. Bracket means 14 are secured adjacent the upper end 11 of the shaft means 10 and extend outwardly therefrom as shown in FIG. 1 of the drawings. Adjustment means are provided to maintain the support means 12 in a predetermined or desired tilted position, such adjustment means including the threaded shaft 16 which is pivotally and swivelly connected at its upper end to the support means 12 as represented at 17 and is threadably secured to the pivotally mounted shaft 18 carried by the bracket 14, the threaded shaft 16 extending through the block or enlarged portion 19 carried on the shaft 18. Thus, when the threaded shaft 16 is rotated, the support 12 is either tilted forward or back and held in such position by the adjustment means as described.

The support means 12 provides a support for the bearings 20a which carry rotatable shaft 20, the shaft 20 extending forwardly of the upright structures U and including frame means referred to generally by the letter F and F₁ secured thereto and providing a support for tubular sections represented at 26 and 27 carried by the uprights U, respectively. The frame means F and F₁ of each upright is adjustable vertically relative to the shaft 20 on which it is carried so that the tubular sections 26 and 27 may be aligned with the shaft 20, and may be aligned relative to each other as will be described.

The lower end of each upright structure U is movably mounted on the first track means 30 by suitable means such as plate 30a on which is mounted the rollers 31 and 32 which rollers engage the top and bottom sides of the rail as illustrated in FIG. 1 of the drawings. The first rail or track means 30 is in turn movably supported on the additional rail 33 by the plate 34 engaged beneath each end of the first rail 30 and provided with rollers 35 and 36 which engage the top and bottom side of the overhang 37 of the rail as shown in FIG. 1 of the drawings. Thus, the upright structures U may be adjusted toward and away from each other along track means 33 and laterally relative to each other along the first track means 30 as desired.

The jack means 10 may be of any suitable structure well known in the art, and as shown, a handle 39 is provided with a ratchet thereon for enabling the portion 40 of the shaft means S to be moved up and down. In addition, it will be noted that the portion 40 is threaded, and is in turn threadably engaged with some portion of the shaft means S so that the support means 12 may be rotated on each upright structure U to any desired angle in a horizontal plane.

Suitable power means are provided on at least one of the upright structures for rotating the rotatable shaft

means 20, and in FIG. 1, it will be noted that the suitable power means are illustrated generally by the numeral 45 as being mounted on the upright structure on the right-hand side of the drawings. Such power means includes a motor 48 connected by belt or chain means 48a to a suitable gear reduction mechanism 49, the output of which is connected through a suitable belt or chain drive represented at 50 to the shaft 20 for rotation thereof.

The frame means F is connected on the forward end of the shaft 20 as previously noted and includes means represented generally at 55 of accommodate vertical adjustment of the frame means F relative to the longitudinal axis of the shaft means 20. The adjustment means 55 includes the threaded shaft 56 threadedly secured through the rearward extension 57 of the vertically extending member 58. The lower end of shaft 56 is swivelly carried at 60 in the extension 61 of the member 62 mounted on the end of rotatable shaft 20. Thus, when the threaded shaft 56 is rotated, movement of the portion 58 relative to the portion 62 which is slidably mounted in a groove therein is accomplished and this in turn raises or lowers the member 58 relative to the longitudinal axis of shaft means 20. Suitable indicia 64 are provided on the side of the member 58 to enable the tubular section 26 to be aligned in a predetermined manner relative to the shaft 20, and if desired, relative to the frame F in which it is carried.

The portion 58 of the frame means F and F₁ includes a forward extension 70 which includes clamp means 71 thereon for retaining the tubular sections in position on each of the frame means F and F₁. The frame means F₁ includes vertically extending member 58 which slidably receives member 62 therein. However, suitable bolt means 58' in FIG. 2 engage 58 and 62 of F₁ together so that they may be manually shifted to any relative longitudinal position and the bolt means then tightened to hold them in place. The clamp means 71 includes cross pieces 72 carried on the extension 70, the cross pieces 72 each being slotted longitudinally as shown at 73. A vertical member 74 fits within the slot 73 and may be pinned at any one of several locations therealong, depending upon the size of tubular sections 26 and 27 to be supported by the respective clamp means 71. Pivotaly secured to the upper end of the vertically extending member 74 is the cross arm 75 which may be of any suitable configuration and is shown as being of a generally V-shaped configuration with one end thereof having a U-shaped bracket 76 formed thereon and pivotaly secured at 77 to the vertically extending arm 74. At the other end of the slot 73, a threaded shaft 80 is carried by the U-shaped bracket 81 which is adapted to be secured by a pin 82 extending there-through. It will be noted that several openings are provided longitudinally of the cross piece 72 so that the U-shaped member 81 may also be moved to several different locations longitudinally thereof, depending upon the diameter of the tubular section to be clamped thereby.

The left-hand portion of FIG. 2 more clearly illustrates the clamping means 71 being described, as it may be viewed in a partial elevation since it is engaged at an angle relative to the frame F₁ which supports it. To accommodate such angular movement, the cross pieces 72 may be provided with a bolt extending therethrough (not shown) which may accommodate the angular relation between the cross piece 72 and the forward extension

70 by loosening the nut engaged with the bolt and permitting the cross piece to tilt as shown in the left-hand side of FIG. 1. When the cross piece 72 is to be used in the vertical position as shown in the right-hand side of FIG. 1, the nut may be tightened against the bolt to retain the cross piece 72 in the desired position on the forward extension 70.

A U-shaped member 85 is provided on the other end of the V-shaped arm 75 and is provided with notches 86 therebetween. The threaded shaft 80 carried by the U-shaped support 81 is provided with a cross arm 88, the ends of which engage in the notch 86. A nut 90 is threadedly engaged with the shaft 80, and upon rotation of the nut 90, the cross piece 88 forces the U-shaped member 85 downwardly, thereby causing the arm 75 to tightly clamp around the tubular section 26 or 27.

In some instances after the two upright structures U have been positioned relative to each other with the tubular sections therein, it may be desirable to accomplish minor adjustment of one section relative to the other. To accomplish this, it is desirable that at least one of the uprights include means for moving the rotatable shaft 20 mounted thereon backward and forward, and in FIG. 1 of the drawings, it will be noted that the rotatable shaft 20 is journaled in the housing 92 which has its lower edge 93 on each side slidably engaged in the groove 94 formed in the support means 12 as shown on the left-hand side of FIG. 1. A threaded shaft 96 is engaged with the end of the support 12 and extends forwardly therefrom, with the nut 97 engaged therewith and connected to the handle 98. When the handle 98 is rotated, the nut 97 is moved along the threaded shaft 96 and the bracket 99 which is secured to the housing 92 and depends downwardly therefrom to surround the shaft 96 is engaged by such nut and thereby moves the housing 20 within the groove 94. This in turn moves the shaft 20 either forwardly or rearwardly and in turn moves the frame F₁ with the clamp means 71 thereon and supported tubular section either forwardly or rearwardly.

In some instances where one of the tubular sections may be of extraordinary length, it may be desirable to provide an additional support represented generally by the numeral 110. In the modification shown in FIGS. 1 and 2 of the drawings, it is to be noted that the tubular section 26 is straight, whereas the tubular section 27 is in the form of an elbow. The frame F₁ of the left-hand portion which supports the elbow or angled portion 27 is provided with suitable brace means 111 for supporting it in a desired position.

After the paired vertical uprights U have been adjusted so that the tubular sections 26 and 27 are aligned with their ends adjacent each other, a spot weld may be provided circumferentially adjacent the abutting end portions to retain them in engagement. Thereafter, power may be supplied to the motor 48 and in turn transmitted through the belt 48a to the gear reduction box 49 and thence through the drive connection 50 to rotate the shaft 20. When the shaft 20 rotates, the frame F and supported tubular member 26 will also rotate, and since the tubular section 27 has now been engaged therewith, it will also rotate along with its supporting frame F₁ and the rotatable shaft 20 carried in the bearing and housing 92. As the tubular sections 26 and 27 rotate, they may be joined together by an automatic welding machine, or by manually welding the

sections as they rotate. Thereafter, the clamp means 71 may be disengaged and the connected sections 26 and 27 removed from the upright structure.

It can be appreciated that the present invention can be employed to align tubular sections of any configuration for welding them together. In FIG. 3, the upright structures U are again shown, the one on the right only being partially shown, the one on the left being shown as before; however, it is pivotally supported as illustrated at 115 adjacent its lower end and carried on the footing 116 which is provided with rollers 31 and 32 for engaging on the first track means 30 as previously described. A suitable support arrangement similar to bracket 14 and threaded shaft 18 (not visible) is carried by the footing 116 and upright U for retaining the upright U in any predetermined angular relationship relative to the footing 116 as may be desired. The remainder of the construction is similar to that previously described except that the adjustment means for moving the shaft 20 forward or rearwardly relative to the support means 12 is arranged towards the rear of the support 12 and includes the threaded shaft 120 swivelly connected at 121 to the extension 122 of the housing and bearing 92 and threadedly connected through the upright 123 forming a part of support means 12. Thus, when the shaft 120 is rotated, the rotatable shaft 20 and housing 92 are moved longitudinally relative to the support means 12 by reason of the extension 122 fitting in the groove 94 formed within the support means 12 as previously described.

FIG. 3 illustrates two straight tubular sections which have their ends cut at an angle aligned for welding together for fabrication. The upright structures may be adjusted in a manner as desired relative to each other to accommodate the aligning of the tubular sections 26a and 27a for abutting their ends together whereupon their end portions may be manually welded to connect the tubular section 26a and 27a together.

A counterweight 150 is provided on the right end of FIG. 1 and is carried on shaft 151 slidably mounted in housing 152. Bolt means 153 engages and holds shaft 151 at any position within housing 152.

The foregoing disclosure and description of the invention are illustrative and explanatory thereof, and various changes in the size, shape, and materials as well as in the details of the illustrated construction may be made without departing from the spirit of the invention.

What is claimed is:

1. An arrangement for aligning tubular sections in end to end relation for securing the tubular sections together including:

a. a pair of upright structures, each of said structures including:

1. vertically extending shaft means;
2. jack means associated with each shaft means for raising and lowering each shaft;
3. support means pivotally connected adjacent the upper end of each of said shaft means;
4. bracket means connected with said shaft means and extending outwardly therefrom;
5. adjustment means having one end pivotally and swivelly connected to said support means, having its outer end threadedly connected with said bracket means whereby said support means may be tilted by said adjustment means;
6. a rotatable shaft carried by each of said support means; and
7. tubular support means mounted on each of said rotatable shafts, said tubular support means including:
 - a. frame means;
 - b. means for adjusting said frame means laterally relative to the longitudinal axis of said shaft means; and
 - c. clamp means for clamping a tubular section in position on said frame means.

2. The invention of claim 1 including movable base means supporting each of said shafts, first track means for accommodating movement of each of said support structures in one horizontal plane, movable support means at each end of said first track means, and additional track means supporting said movable support means whereby each of said support structures may be moved in a second horizontal plane relative to each other.

3. The invention of claim 1 wherein each of said shaft means is threaded to accommodate rotation of said support means adjacent the upper end of said shaft means relative to the remainder of the upright structure.

4. The invention of claim 1 including indicia on said frame means for visual lateral adjustment of said frame means and supported tubular section relative to said shaft means.

5. The invention of claim 1 wherein said clamp means includes a threaded shaft pivotally mounted at one end on said frame means, arm means pivotally mounted on said frame means in spaced relation to said threaded shaft, nut means threadedly engaging said threaded shaft means adjacent one end of said arm for engaging said nut means whereby rotation of said nut means engages said clamp about said tubular section.

6. The invention of claim 1 wherein at least one of said support means is provided with means for rotating said rotatable shaft means.

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