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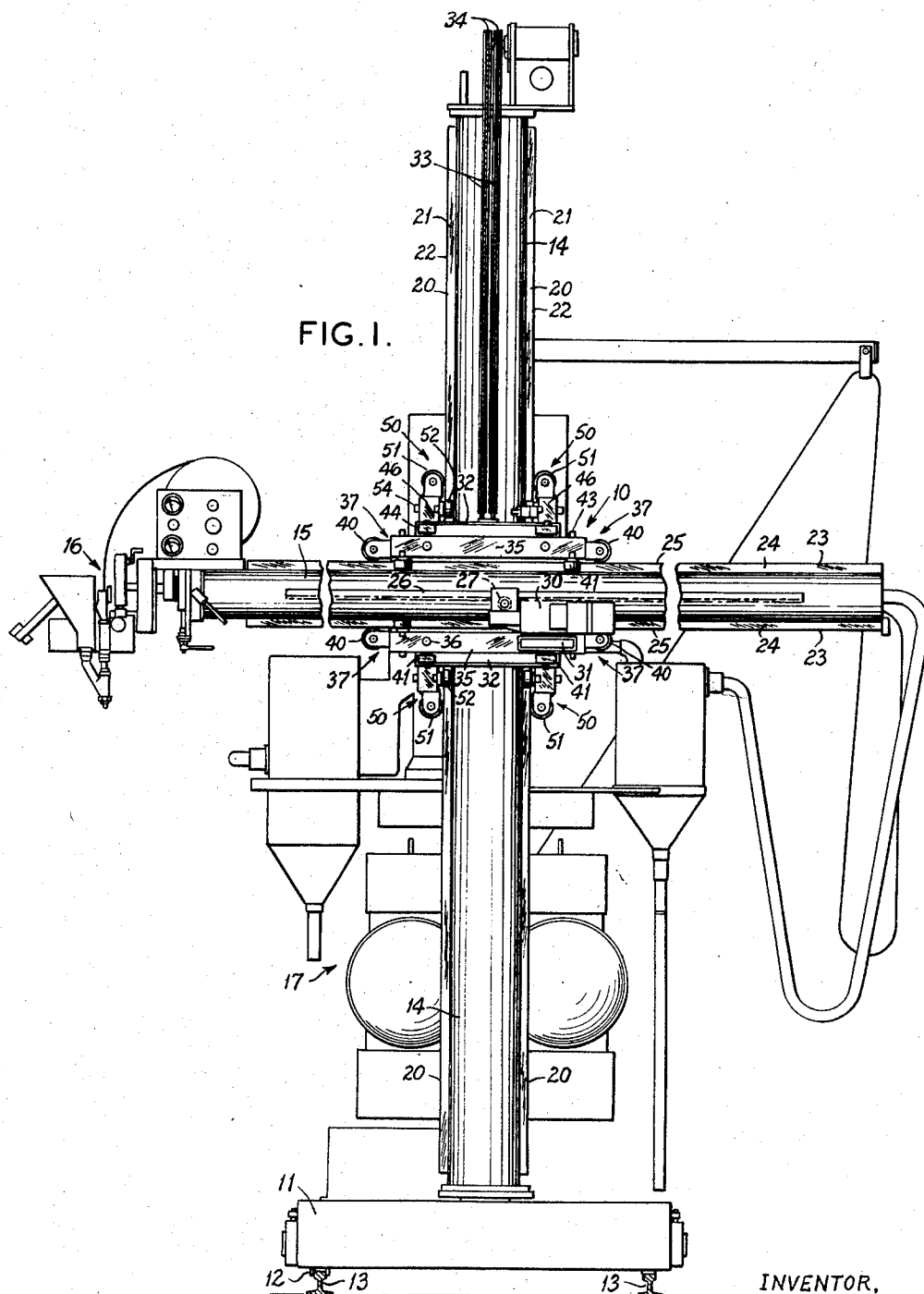
P. P. WUESTHOFF

2,909,394

CROSSHEAD ASSEMBLY

Filed May 28, 1958

4 Sheets-Sheet 1



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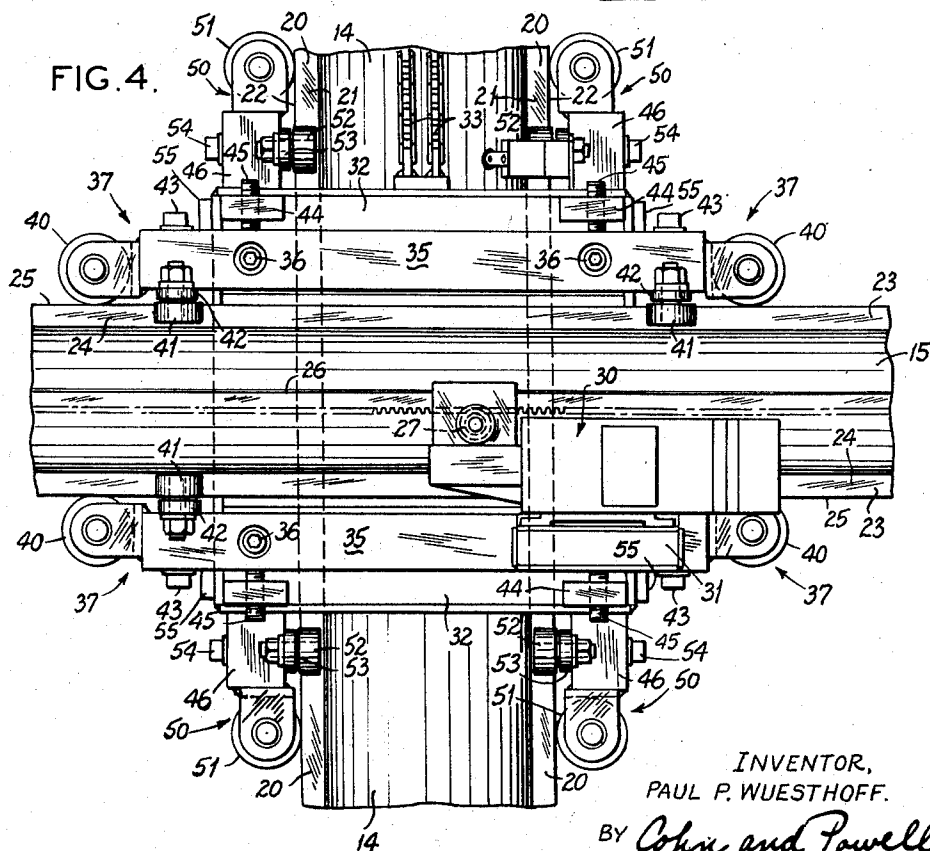
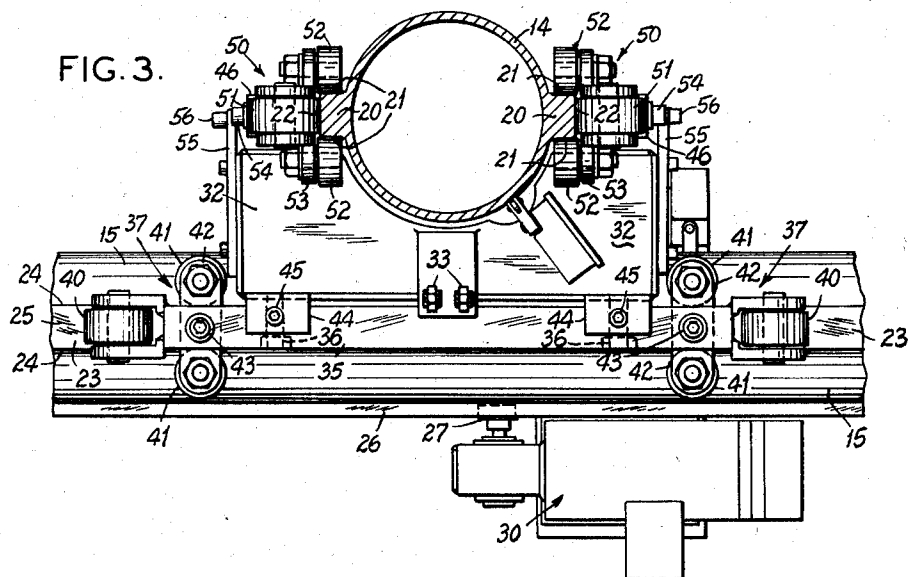
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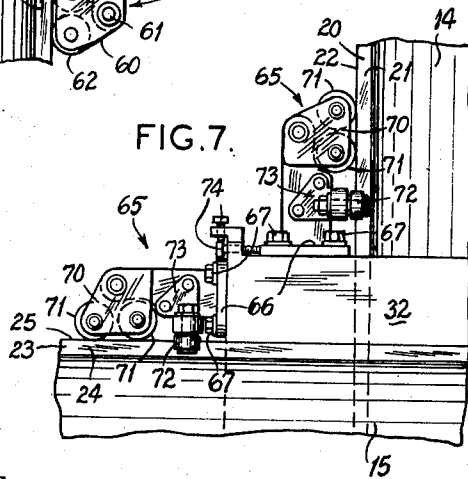
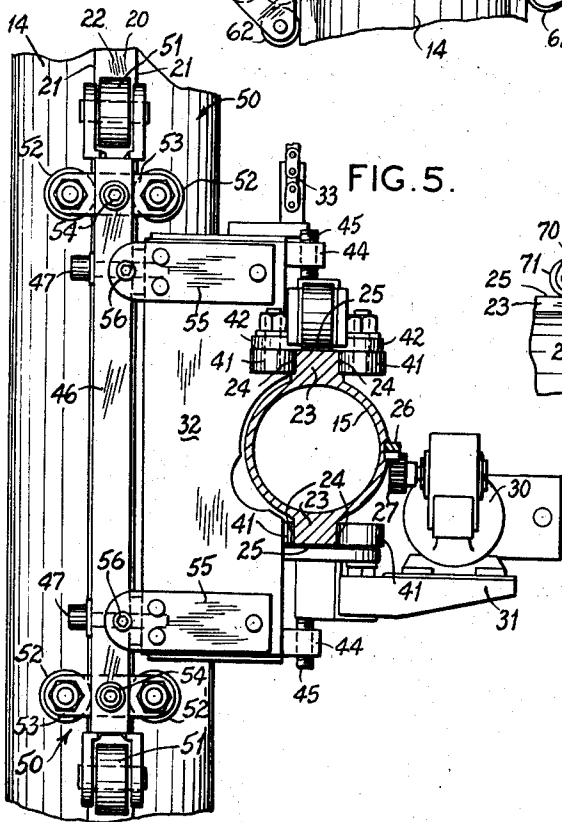
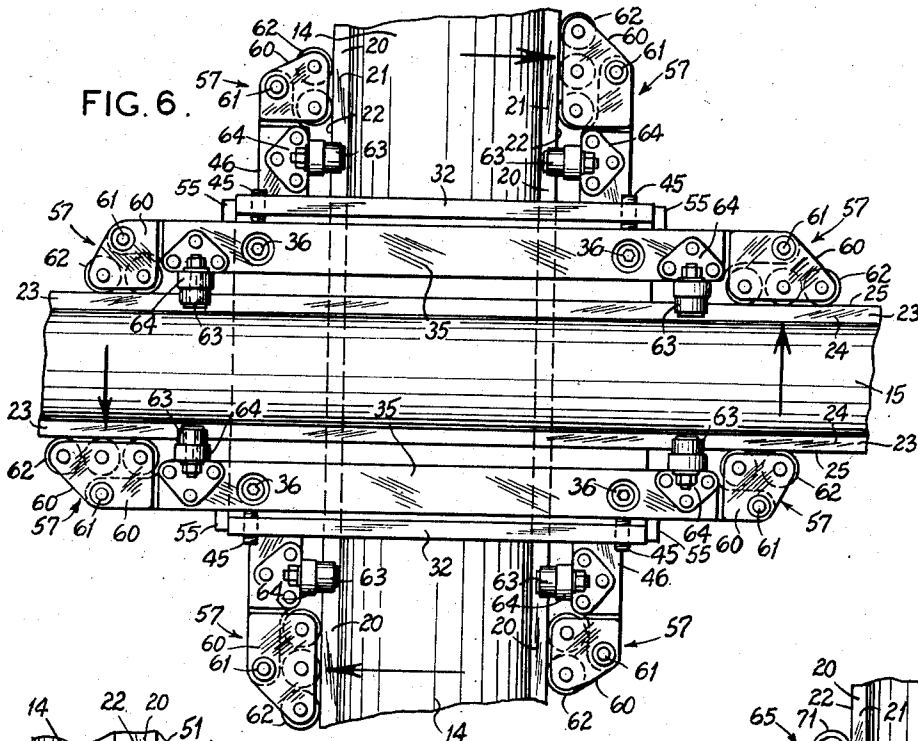
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4 Sheets-Sheet 4



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2,909,394

CROSSHEAD ASSEMBLY

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10 Claims. (Cl. 308—6)

This invention relates generally to improvements in a crosshead assembly for a column and boom, and more particularly to improved roller means on the crosshead cooperating with specific tracks on the vertical column and horizontally related boom so as to facilitate relative adjustment of such members.

In heretofore conventional types of crossheads interconnecting a column and boom, the rollers carried by the crosshead are located and mounted on axes arranged at 45 degrees to the vertical, and the tracks on which the rollers run are substantially of V-shape arranged at 45 degrees to the vertical. The rollers in this arrangement are usually mounted in eccentric bearings for adjustment upon wear. Such eccentric bearings and roller axes are difficult to locate accurately and are relatively expensive to provide.

It is an important objective of the present invention to provide a crosshead assembly that avoids all of the previously described disadvantages, and instead provides adjustable roller mountings which are relatively inexpensive to manufacture and assemble, and provides a structural arrangement that is conducive to minimal wear of rollers and track.

An important object is achieved by the improved mounting and attachment of roller sets on the crosshead which enables selective adjustment of the rollers to compensate for wear either on the track or the rollers.

Another important objective is realized by the provision of roller sets on the crosshead, each set having at least one roller adapted to engage the web of a U-shape track and a pair of side rollers adapted to engage the side walls of the track.

Other important advantages of the above described roller sets are realized by improved mounting of the rollers which enables adjustment of either the web roller or side rollers to compensate for wear.

Yet another important object is realized by the improved mounting of the web rollers in a manner that assures that the rollers of each set will assume their proportion of the load during engagement with the track.

Still another important objective is afforded by the interconnection of certain roller sets on the crosshead by bars, and by the adjustable mounting of the bars which enables selective adjustment of the pressure contact of the rollers on the track.

The foregoing and numerous other objects and advantages of the invention will more clearly appear from the following detailed description of a preferred embodiment, and several modifications, particularly when considered in connection with the accompanying drawings, in which:

Fig. 1 is a front elevational view of a welding manipulator utilizing the improved crosshead assembly for interconnecting a column and boom;

Fig. 2 is a side elevational view of the manipulator as seen from the left of Fig. 1;

Fig. 3 is a top plan view of the crosshead assembly shown in Fig. 1;

Fig. 4 is a front elevational view of the crosshead assembly shown in Fig. 3;

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Fig. 5 is an end elevational view of the crosshead assembly as seen from the left of Fig. 4;

Fig. 6 is a front elevational view of a modified construction of the crosshead assembly, and

Fig. 7 is a fragmentary elevational view of another modified crosshead assembly.

Referring now by characters of reference to the drawing, and first to Figs. 1 and 2, the crosshead assembly generally indicated at 10 is illustrated as being utilized on a welding manipulator although it may be conveniently utilized in any apparatus having a column and boom.

Briefly, the manipulator includes a base 11 on which are mounted a plurality of wheels 12 adapted to engage rails 13 mounted on the subjacent floor. Attached to base 11 and extending vertically upward is a column 14 having the cross sectional configuration as shown more clearly in Fig. 3. A horizontal boom 15 is adjustably related and mounted on column 14 by the crosshead assembly 10. The cross sectional configuration of boom 15 is best shown in Fig. 5.

As stated previously, the manipulator on which the crosshead assembly 10 is illustrated is equipped with welding apparatus. For example, a welding head and control mechanism generally indicated at 16 is carried at one end of horizontal boom 15. In some cases, a chair is provided for the seating of an operator at the end of the boom 15. Other cooperating welding equipment such as flux hoppers and electrical control mechanism referred to generally at 17 is mounted on the base 11 and column 14.

Provided on opposite sides of column 14 is a pair of vertical, longitudinally extending tracks 20 as is best shown in Fig. 3. The tracks 20 are of substantially U-shape having opposed side walls 21 and web 22. Preferably, the side walls 21 and web 22 are related at right angles.

A pair of longitudinally extending tracks 23 is disposed on opposite sides of boom 15. As best shown in Fig. 5, the tracks 23 are of U-shape having opposed side walls 24 and web 25, the side walls and web being disposed in right angular relation.

A gear rack 26 is attached to and extends longitudinally along the boom 15. The rack 26 is adapted to engage a pinion 27 driven operatively by motor 30. As is best seen from Figs. 1 and 5, the motor 30 is carried on a platform 31 attached to a body member 32 of the crosshead assembly 10. Operation of motor 30 acts through pinion 27 and gear rack 26 to move the boom 15 selectively back and forth in a horizontal plane with respect to the crosshead assembly 10 and to the column 14.

A chain 33 is attached to the body member 32 of crosshead assembly 10, the chain 33 extending upwardly along column 14 and over sprockets 34. The chain 33 is operatively connected to a power mechanism and is adapted to raise and lower the crosshead assembly 10 on column 14, and hence position the boom 15 in the desired horizontal plane.

The detailed construction of the crosshead assembly 10 illustrated in Figs. 1 and 2 is perhaps best shown in Figs. 3-5 inclusive.

A pair of boom bars 35 constituting brackets is located on opposite sides of the boom 15 immediately adjacent the boom tracks 23, the boom bars 35 extending longitudinally along the boom 15 and extending across the vertical column 14. A pair of bolts 36 constituting fastening elements secure the boom bars 35 to the body member 32 of crosshead assembly 10. The openings in boom bars 35 through which the bolts 36 extend are slightly elongated to permit the bars 35 to be moved toward and away from the adjacent boom tracks 23.

Mounted on each end of each boom bar 35 is a roller set 37. Each roller set 37 includes a web roller 40 rota-

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tively mounted on the boom bar 35 and adapted to engage the web 25 of track 23, and includes a pair of side rollers 41 rotatively mounted on a crossrod 42 pivotally attached by bolt 43 to the boom bar 35. The side rollers 41 are adapted to engage the opposed side walls 24 of boom track 23 disposed therebetween.

To compensate for wear either in the side walls 24 of track 23 or in the side rollers 41, the crossrod 42 can be swingingly adjusted about its pivot axis to regulate the pressure contact of the side rollers 41 with the side track walls 24, and is retained in the adjusted position upon tightening of bolt 43.

The body member 32 includes plates 44 extending outwardly across the boom bars 35. A pair of set screws 45 engages each of the boom bars 35, the set screws 45 being threadedly connected to the plates 44 and preferably located immediately adjacent the fastening bolts 36. In order to compensate for wear either in the track web 25 or in web roller 40, the bolts 36 are loosened to detach the boom bar 35 from the body member 32, and then the set screws 45 are manipulated to urge the boom bar 35 and hence the web rollers 40 toward the track 23, and thus regulate the pressure contact of web roller 40 with the track web 25. When the position of the boom bars 35 are determined by set screws 45, the bolts 36 are tightened to again fasten the bar to the body member 32, and hence maintain the bar 35 and web rollers 40 in the adjusted position.

A similar structural arrangement operatively interconnects the body member 32 of crosshead assembly and the vertical column 14. For example, a pair of column bars 46 constituting brackets is located on opposite sides of column 14 and extends longitudinally along the opposed column tracks 20, the column bars 46 extending across the boom 15. A pair of bolts 47 secure each column bar 46 to the crosshead body member 22.

A similar roller set 50 is mounted at each end of each column bar 46. Each roller set 50 includes a web roller 51 rotatively mounted on column bar 46 and adapted to engage the track web 22, and includes a pair of side rollers 52 rotatively mounted on opposite ends of a crossrod 53 pivotally mounted by bolt 54 to the column bar 46. The side rollers 52 are adapted to engage the opposed side walls 21 of column track 20.

In order to compensate for wear either in the side track walls 21 or in the side rollers 52, the bolt 54 is loosened and the crossrod 53 is swingingly adjusted to regulate the pressure contact of side rollers 52. After adjustment, the bolt 54 is tightened and the side rollers 52 are retained in the adjusted position.

The body member 32 includes plates 55 that extend over the outer side of column bars 46. Set screws 56 are threadedly attached to the plates 55 and engage the outer side of each column bar 46. Preferably a pair of set screws 56 engages each column bar, the set screws 56 being located immediately adjacent the bolts 47.

In order to compensate for wear either of the track web 22 or the web roller 51, the bolts 47 are loosened and the set screws 56 are threadedly adjusted to regulate the contact pressure of the web rollers 51. After adjustment of the column bars 46 and the web rollers 51 by set screws 56, the bolts 47 are tightened to secure the column bar 46 in the adjusted position on the crosshead body member 32.

Fig. 6 illustrates a modified crosshead assembly interconnecting the column 14 and boom 15. It will be noted that the crosshead assembly includes a similar body member 32, boom bars 35 connected to crosshead body member 32 by similar bolts 36, and similar set screws 45 threadedly attached to body member 32 and engaging the boom bars 35. Similarly, column bars 46 are provided, attached to the body member 32 which have the same adjustment features by set screws as described previously with respect to the crosshead assembly disclosed in Fig. 5. The major distinction between the crosshead as-

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sembly of Fig. 6 and that disclosed in Figs. 3-5 resides in the structural arrangement of the roller sets generally indicated at 57.

When a load is carried at one end of boom 15, such as the welding equipment 16 illustrated in Fig. 1, the moment will cause the greatest pressure to occur at the roller points indicated by the arrows in Fig. 6. At these high pressure points, it is desirable and frequently necessary for the roller sets 57 to have more web rollers than the roller sets at the other corners of the crosshead assembly in order to avoid excessive wear of the track and of the rollers.

Each of the roller sets 57 in Fig. 6 includes a yoke 60 pivotally attached by pin 61 to the respective boom and column bars 35 and 46. Rotatively mounted in yoke 60 are a plurality of web rollers 62 adapted to engage the track web. The yoke 60 is freely movable about its pivot axis 61 to enable the web rollers 62 to assume their proportion of the load. The contact pressure of rollers 62 is regulated in the usual manner by the set screws engaging the boom and column bars 35 and 46 as discussed previously with respect to the construction illustrated in Fig. 5.

In the modified structure of Fig. 6, each of the roller sets 57 includes a pair of side rollers 63 each mounted on a bracket 64 fastened to the boom or column bar 35-46. This is an alternate construction from that shown in Figs. 3-5. Obviously the swingable bar construction of Figs. 3-5 could be utilized in the modified roller set 57 of Fig. 6. The side roller assembly of roller set 57 in Fig. 6 can be adjusted to regulate the contact pressure of the side rollers 63 with the track by removing or replacing shims between the bracket 64 and the respective boom and column bar.

Still another modified construction of the assembly is illustrated in Fig. 7. The roller sets 65 are mounted and carried on brackets 66 secured by bolts 67 to the crosshead body member 32. The particular roller set 65 illustrated in Fig. 7 includes a yoke 70 pivotally mounted on the bracket 66 and a plurality of web rollers 71 rotatively mounted on yoke 70 and adapted to engage the track web. Further, the roller set 65 includes a yoke 70 pivotally mounted on the bracket 66 and a plurality of web rollers 71 rotatively mounted on yoke 70 and adapted to engage the track web. Further, the roller set 65 includes a pair of side rollers 72 rotatively mounted on bracket 73 attached to bracket 66.

The side rollers 72 can be adjusted to regulate the contact pressure with the side track walls in the manner discussed previously with respect to the assembly of Fig. 6 in that shims may be replaced or removed between the bracket 73 and bracket 66.

The openings in bracket 66 through which bolts 67 extend are enlarged to enable adjustment of the bracket 66 toward and away from the track when the bolts 67 are loosened. Set screws 74 are threadedly attached to the crosshead body member 32 and engage the bracket 66. To regulate the pressure of web rollers 71, the bolts 67 are loosened and the set screws 74 are adjusted. After adjustment of set screws 74, the bolts 67 are tightened to secure the bracket 66 in its adjusted position on body member 32 and hence retain the web rollers in the adjusted position.

Although the invention has been described by making detail reference to a preferred embodiment and several modifications, such detail is to be understood in an instructive, rather than in any restrictive sense, many variants being possible within the scope of the claims hereunto appended.

I claim as my invention:

1. A crosshead assembly for a column and a boom each including opposed longitudinal tracks, each track being of substantially U-shape having a web and side walls, the crosshead comprising a body member, a boom roller set at each side of the column and on opposite sides

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of the boom, a column roller set above and below the boom and on the opposite sides of the column, brackets attached to said body member and carrying said roller sets, each roller set including a yoke pivotally attached to said bracket, a plurality of web rollers mounted in said yoke, and a pair of side rollers, the web rollers and side rollers of the column roller sets engaging the web and side walls respectively of the opposed column tracks, and means adjustably mounting the brackets to the body member for moving the roller sets in adjusted relation to tracks.

2. A crosshead assembly for a column and a boom each including opposed longitudinal tracks, each track being of substantially U-shape having a web and side walls, the crosshead comprising a body member, a boom roller set at each side of the column and on opposite sides of the boom, a column roller set above and below the boom and on opposite sides of the column, brackets attached to said body member and carrying said roller sets, said roller sets including a web roller and side rollers, a crossbar pivotally attached to each said bracket, the side rollers being mounted on each end of said crossbar, the web roller and side rollers of the boom roller sets engaging the web and side walls respectively of the opposed boom tracks, the web rollers and side rollers of the column roller sets engaging the web and side walls respectively of the opposed column tracks, the crossbars being swingingly adjusted to regulate contact of the side rollers with the side walls of the tracks disposed therebetween, and means adjustably mounting the brackets to said body member for regulating the pressure contact of said web rollers with said tracks.

3. A crosshead assembly for a column and boom each including opposed longitudinal tracks, each track being of U-shape having a web and side walls, the crosshead comprising a body member, a pair of boom bars adjustably fastened to the body member, one boom bar being located above the boom and the other located below, and both bars extending across the column, a boom roller set mounted on each end of each boom bar, the boom roller sets including a web roller and side rollers engaging the web and side walls respectively of the opposed boom tracks, a pair of column bars adjustably fastened to the body member and located on opposite sides of the column, the column bars extending across the boom, a column roller set mounted on each end of each column bar, the column roller sets including a web roller and side rollers engaging the web and side walls respectively of the opposed column tracks, cross rods pivotally attached at each end of each boom and column bar, the side rollers of said roller sets being mounted on the cross rods, the cross rods being swingingly adjustable to regulate contact of the side rollers with the side walls of the track disposed therebetween.

4. A crosshead assembly for a column and boom, each including opposed longitudinal tracks, each track being of U-shape having a web and side walls, the crosshead comprising a body member, a pair of boom bars adjustably fastened to the body member, one boom bar being located above the boom and the other located below, and both bars extending across the column, a boom roller set mounted on each end of each boom bar, the boom roller sets including a web roller and side rollers engaging the web and side walls respectively of the opposed boom tracks, a pair of column bars adjustably fastened to the body member and located on opposite sides of the column, the column bars extending across the boom, a column roller set mounted on each end of each column bar, the column roller sets including a web roller and side rollers engaging the web and side walls respectively of the opposed column tracks, a yoke pivotally attached to each end of the said bars, the said roller sets having a plurality of web rollers rotatively mounted in said yoke and adapted to engage the adjacent track web.

5. A crosshead assembly for a column and a boom

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each including opposed longitudinal tracks, each track being of U-shape having a web and side walls, the crosshead comprising a body member, a pair of boom bars adjustably fastened to the body member and extending across the column, one boom bar being located above the boom and one bar located below, a pair of column bars adjustably fastened to the body member and extending across the boom, the column bars being located on opposite sides of the column, a roller set mounted on each end of each bar, each roller set including a web roller adapted to engage the web of the track, a crossrod pivotally attached to the bar, and side rollers mounted to the crossrod adapted to engage the side walls of the track, the crossrod being swingingly adjustable to regulate contact of the side rollers with the side walls of the track disposed therebetween, the bars being located adjacent and extending longitudinally along in spaced relation to the web of the tracks, threaded elements on the body member engaging the bars to adjust the position of the bars on the body member and to regulate the contact of the web rollers on the tracks, and fasteners attaching the bars to the body member in adjusted position as determined by the threaded elements.

6. A crosshead assembly for a column and a boom each including opposed longitudinal tracks, each track being of U-shape having a web and side walls, the crosshead comprising a body member, a pair of boom bars adjustably fastened to the body member and extending across the column, one boom bar being located above the boom and one bar being located below, a pair of column bars adjustably fastened to the body member and extending across the boom, the column bars being located on opposite sides of the column, a roller set mounted on each end of each bar, the roller set including a yoke pivotally attached to the bar, a plurality of rollers mounted in the yoke adapted to engage the web of the track, a crossrod pivotally attached to the bar, and side rollers mounted on the crossrod adapted to engage the opposed side walls of the track disposed therebetween.

7. A crosshead assembly interconnecting a vertical column and a horizontal boom, opposed U-shaped tracks extending longitudinally on the column and on the boom, said track having a web and opposed side walls, the crosshead comprising a body member, a plurality of roller sets engaging each track, each roller set including a web roller engaging the web of the track and side rollers engaging the opposed side walls of the track, brackets carrying said roller sets, an adjustable connection between the brackets and the body member to regulate the contact of said web roller, said roller set including a cross rod pivotally attached to the bracket, the side rollers being mounted on said cross rod, the cross rod being swingingly adjustable to regulate the contact of said side rollers with the side walls of the track disposed therebetween.

8. A crosshead assembly interconnecting a vertical column and a horizontal boom, opposed U-shaped tracks extending longitudinally on the column and on the boom, said tracks having a web and opposed side walls, the crosshead comprising a body member, a plurality of roller sets engaging each track, each roller set including a web roller engaging the web of the track and side rollers engaging the opposed side walls of the track brackets carrying said roller sets, an adjustable connection between the brackets and the body member to regulate the contact of said web roller, said roller set including a yoke pivotally attached to the bracket, a plurality of web rollers mounted in the yoke, the yoke being pivotally adjustable to distribute pressure load on said web rollers.

9. A crosshead assembly interconnecting a vertical column and a horizontal boom, U-shaped tracks extending longitudinally along opposite sides of the column and the boom, the tracks having a web and opposed side walls, a bar extending longitudinally along each track,

a pair of said bars extending along the column tracks and bridging the boom, and a pair of said bars extending along the boom tracks bridging the column, a plurality of roller sets mounted on each bar, each roller set including a web roller engaging the web of the track and side rollers engaging the opposed side walls of the track, means on the body member for adjusting the position of the bars, means for securing the bars in adjusted position on the body member, each roller set including a cross rod pivotally attached to the bar, the side rollers being mounted on the cross rod and engaging the side walls of the track disposed therebetween, a yoke pivotally attached to the bars, and a plurality of web rollers mounted in the yoke adapted to engage the web of the track.

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10. The combination and arrangement of elements as recited above in claim 9, but further characterized in that the means for adjusting the position of the bars consist of threaded elements attached to the body member and engaging the bars, the threaded elements regulating the degree of pressure contact of the web rollers with the track webs.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,909,394

October 20, 1959

Paul P. Wuesthoff

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the grant, lines 2 and 12, and in the heading to the printed specification, lines 3 and 4, name of assignee, for "Pandjiris Weldment Co.", each occurrence, read -- Pandjiris Weldment Co. --.

Signed and sealed this 12th day of April 1960.

(SEAL)
Attest:

KARL H. AXLINE

Attesting Officer

ROBERT C. WATSON
Commissioner of Patents