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 [73] Assignee **United States Steel Corporation**

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[54] **BAR BUNDLING CRADLE**
 10 Claims, 4 Drawing Figs.
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 211/60 R, 214/8 R, 214/10.5
 [51] Int. Cl. B65g 1/14
 [50] Field of Search 214/8, 6, 6
 H, 6 K, 6 P, 6 S, 6 D, 10.5; 211/60 R, 60 S

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ABSTRACT: A bundling cradle for bars includes a plurality of longitudinally spaced-apart assemblies. Each assembly has two spaced-apart upwardly extending arms with a vertical post between the arms. A chain extends between one arm and the post with a chain-supporting sprocket attached to either the arm or post. The position of the post with respect to the arms is adjustable so that the catenary of the chain may be varied to vary the size of the bundle. After the desired number of bars are accumulated they are banded in position and then removed.

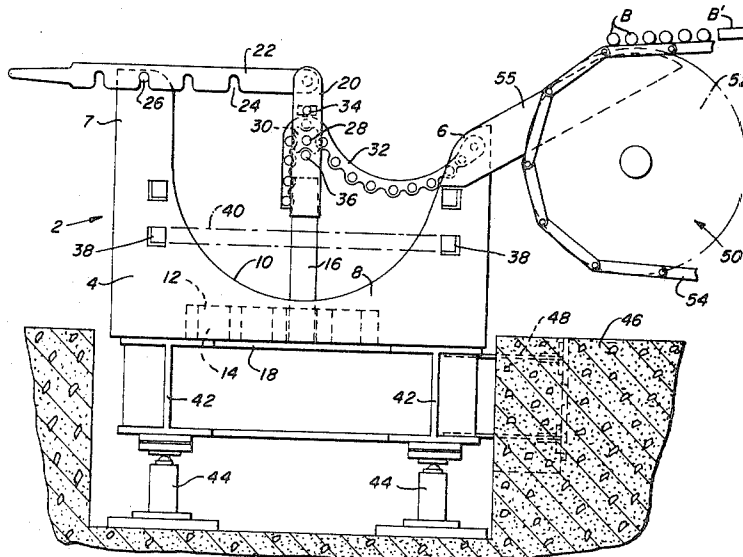


FIG. 1

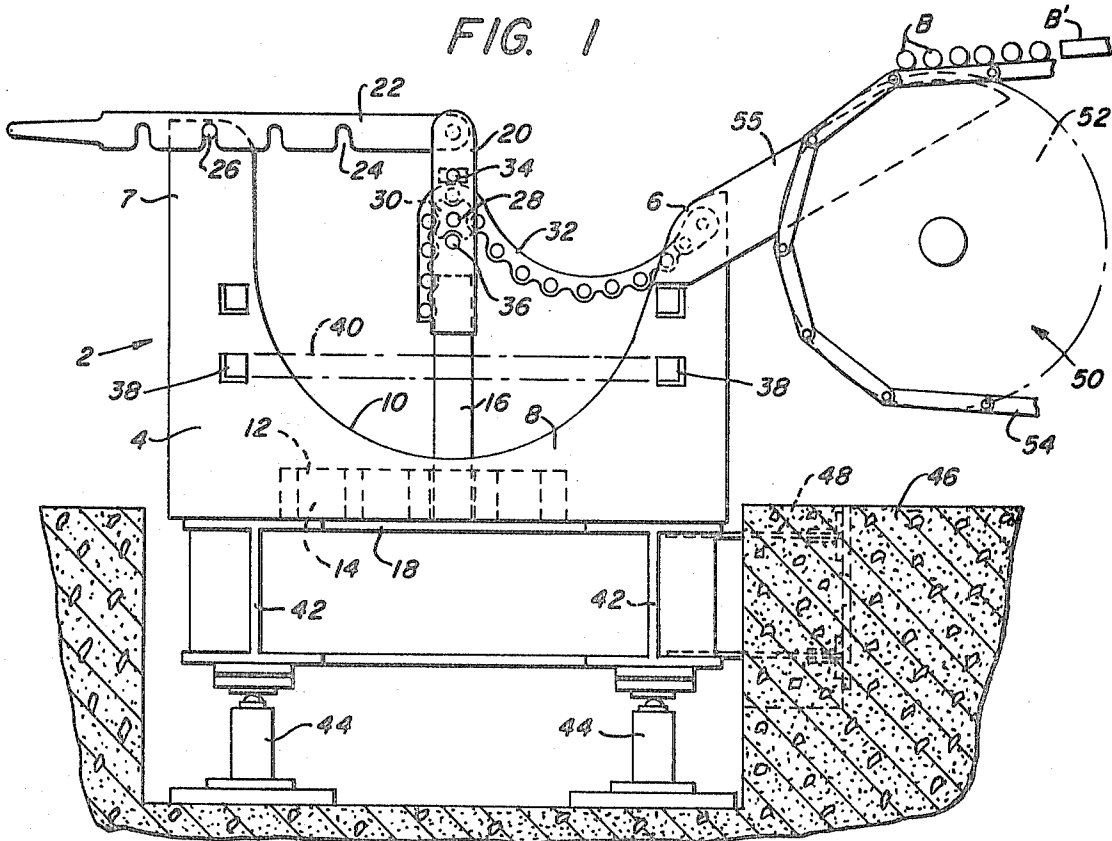
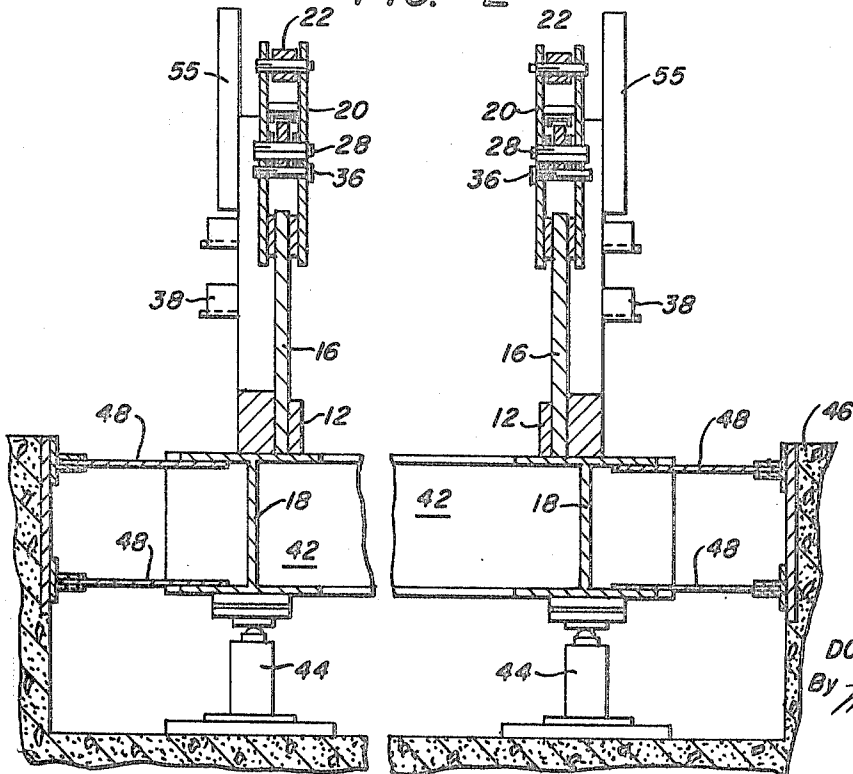


FIG. 2



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FIG. 3

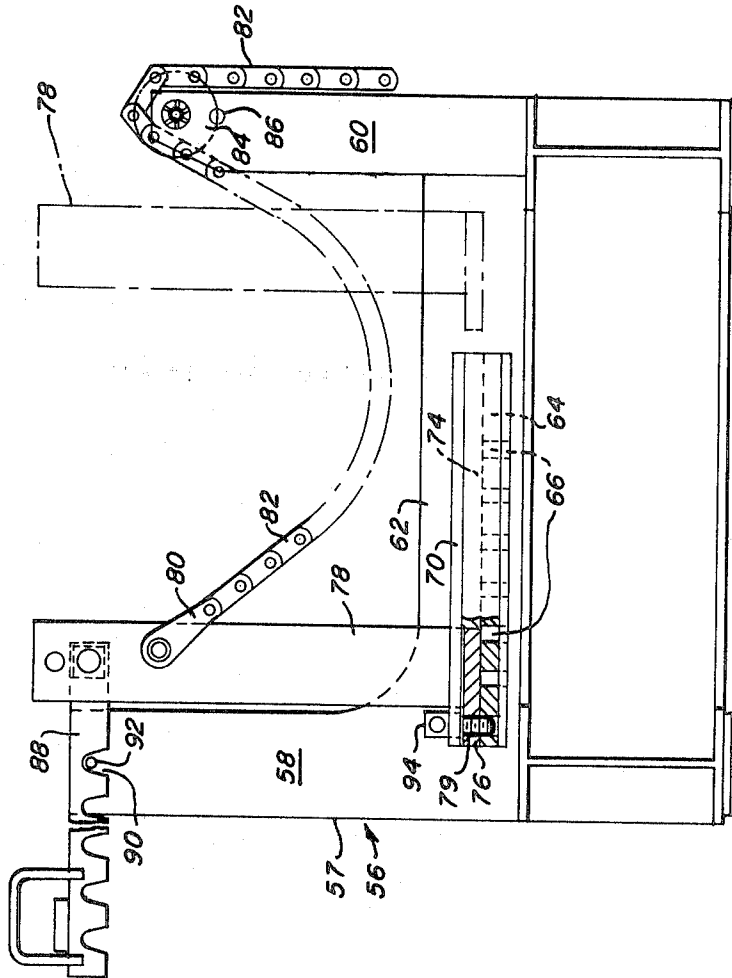
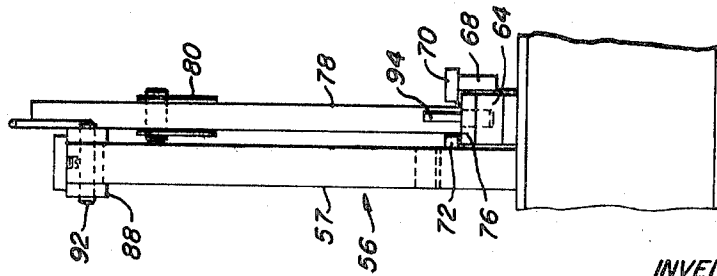


FIG. 4



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BAR BUNDLING CRADLE

This invention relates to a cradle for bundling a plurality of barlike objects such as bars, rods or pipes. Prior to my invention bars of a desired length were fed to and collected on a cradle having a solid bottom. Chain or cable slings were then placed around the bars and attached to the hooks of an overhead crane. When lifted from the cradle this formed a bundle of relatively uniform shape which was strapped or banded while supported by the crane. Thus, considerable crane time was required.

It is therefore an object of my invention to provide a bar bundling cradle which is so constructed that bars can be assembled to form a bundle of the desired shape and which permits banding of the bundle in the cradle.

Another object is to provide such a cradle which can be adjusted to assemble bundles of various sizes and shapes.

These and other objects will be more apparent after referring to the following specification and attached drawings, in which:

FIG. 1 is an elevation of the preferred embodiment of my invention;

FIG. 2 is a section elevation through the post of FIG. 1;

FIG. 3 is a view, similar to FIG. 1, but with parts broken away showing a second embodiment of my invention; and

FIG. 4 is an end view of FIG. 3.

Referring more particularly to FIGS. 1 and 2 of the drawing, reference numeral 2 indicates a cradle assembly, a plurality of which are spaced-apart longitudinally and connected to make a cradle. While only two end cradles are shown in FIG. 2, any desired number of intermediate assemblies may be provided. Each assembly consists of a generally U-shaped member 4 having generally vertical arms 6 and 7 connected by means of a generally horizontal base 8. As shown this provides an arcuate supporting surface 10. A bar 12 is welded to the base 8 and has a plurality of sockets 14 therein for selectively receiving a post 16. The top flange of beam 18 closes the bottoms of sockets 14. The post 16 has a bifurcated upper end 20. A brace arm 22 is received between and pivotally connected to the arms of the bifurcated upper end 20. The arm 22 has a plurality of spaced-apart notches or openings 24 which are adapted to receive a pin 26 extending from the arm 7. A shaft 28 supported by the arms of the bifurcated end 20 supports a sprocket 30 having a chain 32 draped thereover. A removable pin 34 prevents the chain 32 from slipping up off the sprocket. A second pin 36 also supported by the bifurcated upper end 20 prevents rotation of the sprocket 30. The other end of the chain 32 is fixed to the arm 6. A socket 38 is mounted on each of the arms 6 and 7 and detachably receives a bar 40 for a purpose which will appear later.

The assemblies 2 are mounted on longitudinal beams 42 to which they are welded. The beams 42 are supported on load cells 44. The beams 18 and 42 are preferably connected to a support 46 by means of flexure plates 48. A conveyor 50 including sprockets 52 and chains 54 (only one of which is shown) feed bars B or B' to the cradle over guides 55 in a well-known manner.

Depending upon the size of the bundle which is to be prepared, the post 16 of each assembly is positioned in the desired socket 14 with the posts 16 of all assemblies in alignment. In order to do this, it is necessary to raise the brace arm 22 from the pin 26. After positioning the post 16, the arm 22 is lowered over the pin 26 so as to brace the post 16 against transverse movement. It will be seen that the sockets 14 and notches 24 are similarly spaced so that the post 16 is always positioned vertically. With the pin 36 removed, the sprocket 30 is turned to position the chain 32 to provide the desired catenary and the locking pin 36 is then replaced. The conveyor 50 is then operated to feed the bars B into the cradle. After the required weight of bars, as determined by the load cells 44, has accumulated the conveyor 50 is stopped and the accumulated bars banded while laying in the chains 32. The load is then removed by an overhead crane. Generally the depth is greater than shown so that larger bundles can be formed. The operation is then repeated with the parts in the

same position as long as the same size bundle is desired. When a larger or smaller bundle is desired, the arm 22 is raised, the post 16 positioned in a different socket 14, pin 36 is removed and the sprocket 30 turned to position chain 32 to provide the desired catenary. The cradle is then loaded as before.

When a very large bundle of bars is to be formed, the post 16 and associated parts are removed and the bars are received directly on the supporting surface 10. When rectangular bundles of rectangular bars B' are to be piled the arm 16 with associated mechanism of each assembly is removed and the bar 40 is placed in the sockets 38. Rectangular bars B' are fed by the conveyor 50 and are stacked manually on the bars 40. After the desired load as determined by the load cells 44 has accumulated, the bars are banded and the bundle then removed.

In the embodiment of my invention shown in FIGS. 3 and 4, assemblies 56 are substituted for the assemblies 2. Each assembly 56 includes a U-shaped member 57 having vertical arms 58 and 60 connected by flat base member 62. A horizontal bar 64 is welded to the base 62 and has spaced vertical holes 66 therein. A bar 68 extends upwardly from bar 64 and is welded thereto. A horizontal bar 70 is welded to the bar 68 and extends over a portion of bar 64. A horizontal bar 72 aligned with bar 70 is welded to base 62. This provides a slide 74 for receiving the enlarged base 76 of an L-shaped post 78. The base 76 has a hole 79 therethrough. The post 78 has links 80 pivoted thereto for receiving one end of a chain 82, the other end of which passes around a sprocket 84 mounted on arm 60. A removable pin 86 locks the sprocket 84 in adjusted position. A brace arm 88 is pivotally mounted to the top of post 78 and is provided with openings or notches 90 for receiving a pin 92 mounted on arm 58.

In operation, the post 78 is positioned in the desired location between the arms 58 and 60 with the hole 79 in alignment with one of the holes 66. A pin 94 is then passed through holes 66 and 79 to lock the bottom of post 78 in position and the brace arm 88 positioned as shown with the pin 92 being received in notch 90 substantially as in the first embodiment. The pin 86 is removed and the sprocket 84 rotated to position the chain 82 to provide the desired catenary after which the pin 86 is replaced. The operation is then substantially as in the first embodiment. The post 78 is placed in the slide 74 by moving the post 78 from the position shown in dash-dot lines in FIG. 3 toward the left.

While one embodiment of my invention has been shown and described, it will be apparent that other adaptations and modifications may be made.

I claim:

1. A bundling cradle for barlike objects comprising a plurality of assemblies spaced-apart longitudinally of said cradle; each of said assemblies including a generally vertical post, a first upwardly extending arm along one longitudinal side of said cradle, a second upwardly extending arm along the other longitudinal side of said cradle, said post being located between said arms, a flexible member arranged in a loop between said first arm and said post, a brace arm having one end pivotally connected to said post adjacent the top thereof, a plurality of transversely spaced-apart sockets for receiving the bottom of said post, said brace arm having a plurality of openings therethrough spaced-apart transversely in the same manner as said sockets, and a pin extending from said second arm adapted to be selectively received in one of said openings to connect said brace arm to said second arm; and means connecting said assemblies together with their posts in longitudinal alignment.

2. A bundling cradle according to claim 1, in which said post has a bifurcated upper end for receiving said bundle.

3. A bundling cradle according to claim 2 including a sprocket received in said bifurcated upper end with its axis horizontal; and a pin removably supported by said bifurcated upper end adjacent said sprocket to prevent movement thereof; and in which said flexible member is a chain engaging said sprocket.

4. A bundling cradle according to claim 3 including a generally U-shaped plate member having a bottom base connecting said first and second arms, and a plate secured to said bottom base with said sockets formed therein.

5. A bundling cradle according to claim 1 including a generally U-shaped plate member having a bottom base connecting said first and second arms, and a plate secured to said bottom base with said sockets formed therein.

6. A bundling cradle according to claim 5 including load cells for supporting said assemblies.

7. A bundling cradle according to claim 6 including a conveyor for feeding said objects to said cradle over said first upwardly extending arm.

8. A bundling cradle for elongated barlike objects comprising a plurality of assemblies spaced-apart longitudinally of said cradle; each of said assemblies including a generally vertical post, a first upwardly extending arm long one longitudinal side of said cradle, a second upwardly extending arm along the other longitudinal side of said cradle, said post being located between said arms, a flexible member arranged in a loop

between said first arm and said post for receiving said objects, means for adjusting the length of said flexible member between said first arm and said post, means for locking the flexible member in adjusted length position, means for adjusting the position of said post transversely with respect to said arms to vary the cantenary of said flexible member, a brace arm, means connecting one end of said brace arm to the top of said post, and means adjustably connecting the other end of said brace arm to said second arm; and means connecting said assemblies together with their posts and flexible members in longitudinal alignment.

9. A bundling cradle according to claim 8 in which said means for adjusting the length of said flexible member includes a sprocket supported on one of said post and first arm with its axis horizontal, said flexible member being a chain engaging said sprocket.

10. A bundling cradle according to claim 8 including a conveyor for feeding said objects to said cradle over said first upwardly extending arm.

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