

[54] **IDLER ROLL MOUNTING
CONSTRUCTION**

[75] Inventors: **Charles H. Bode, Jr.**, Upper St. Clair Township, Allegheny County;
Wilmer C. Wrhen, Oil City, both of Pa.

[73] Assignee: **United States Steel Corporation**, Pittsburgh, Pa.

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Primary Examiner—Evon C. Blunk

Assistant Examiner—Hadd S. Lane

Attorney—Walter P. Wood

[57] **ABSTRACT**

A construction for mounting idler rolls in a roll-rack of a continuous-casting machine. The rolls are arranged in sets of top and bottom clusters, which can be withdrawn from the supporting structure or inserted at one side of the roll rack, the concave side if the rack is curved. Each bottom cluster rests on respective seat fixed within the supporting structure. Each top cluster is held in the supporting structure with keys which are received in openings in straps. Both top and bottom clusters have legs engageable by an extractor for withdrawing or inserting them.

[56] **References Cited**

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3,331,488 7/1967 Wellman198/127

9 Claims, 5 Drawing Figures

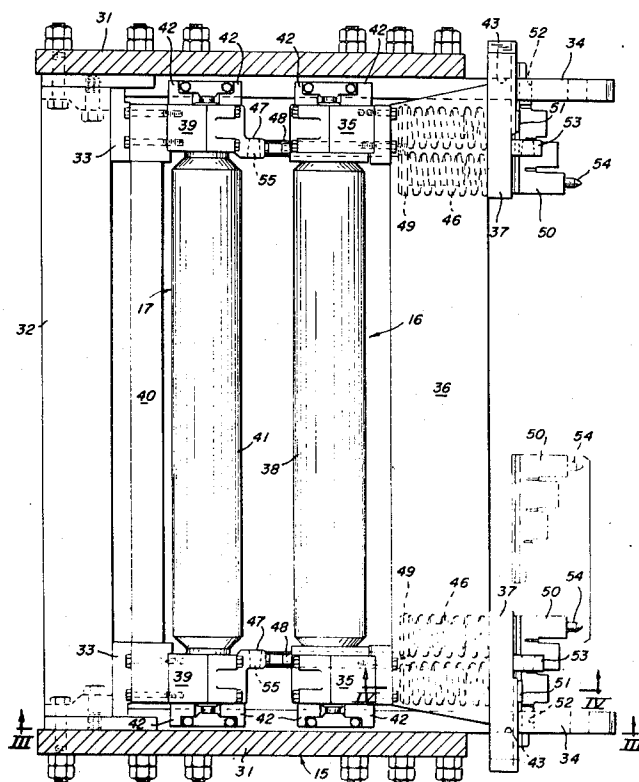
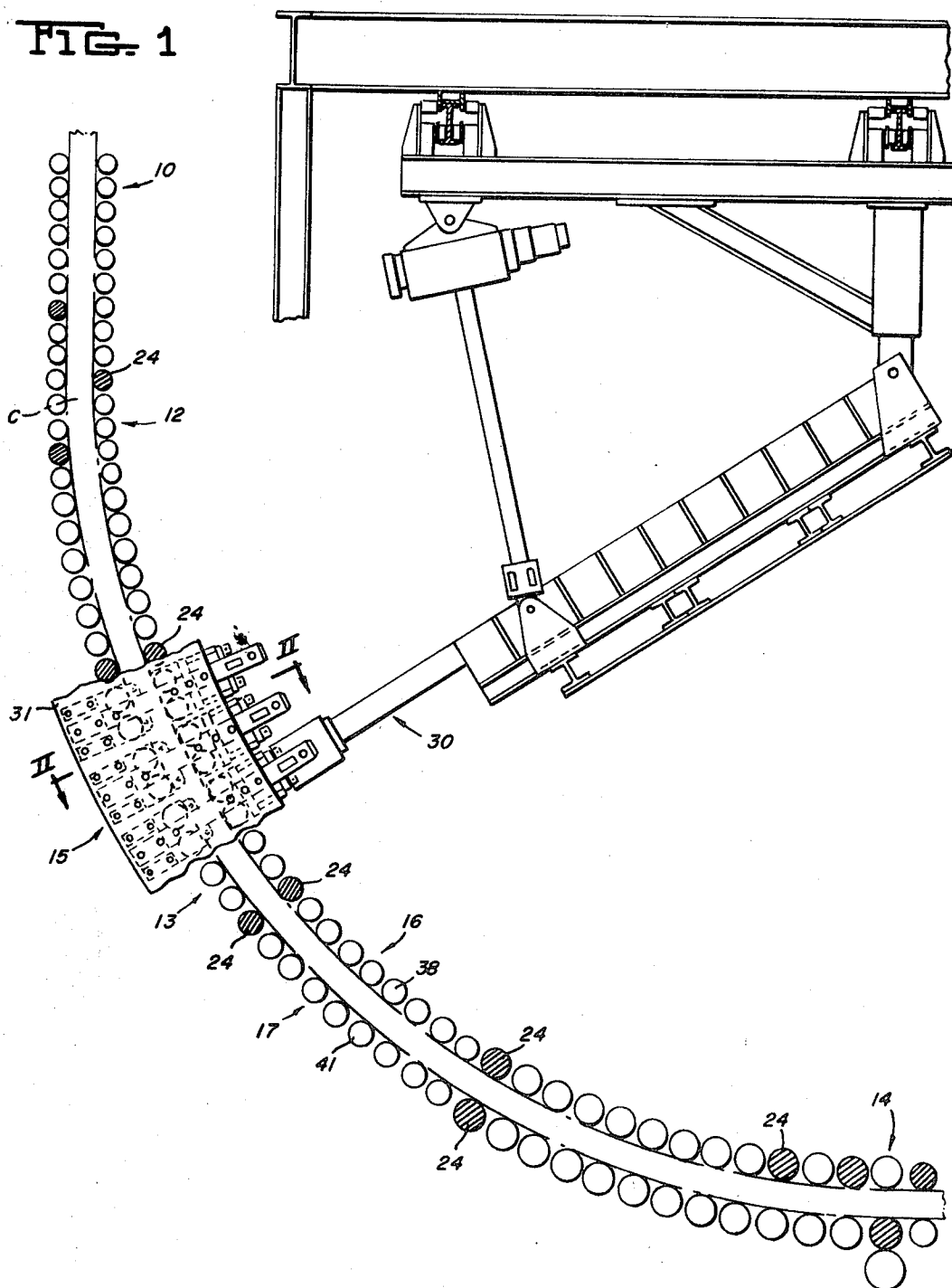
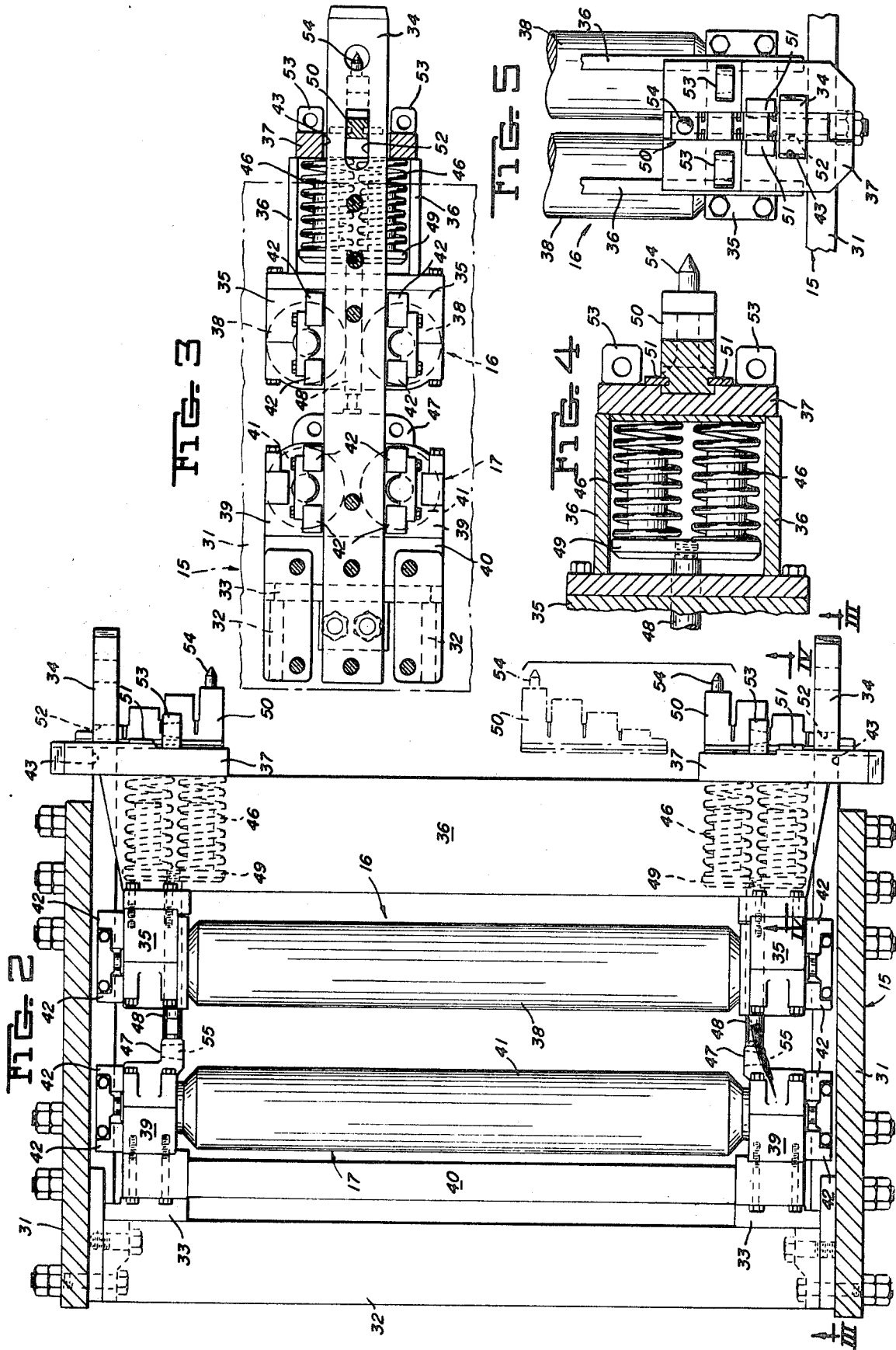


FIG. 1





IDLER ROLL MOUNTING CONSTRUCTION

This invention relates to an improved construction for mounting idler rolls in a roll-rack of a continuous-casting machine.

The form of continuous-casting machine in which our roll-mounting construction is used includes an open-ended, water-cooled, vertically oscillating mold, from the lower end of which a partially solidified casting of indefinite length emerges continuously. Below the mold the casting travels between series of rolls, included among which is a curved roll-rack for changing the direction of travel of the casting from vertical to horizontal. Details of course vary. The mold may be straight, in which event the casting travels through a straight vertical roll-rack and a bending-roll unit before entering the curved roll-rack. Alternatively the mold may be curved to form a casting which is curved from its inception and which goes directly from the mold into the curved roll-rack. Various rolls among the foregoing are driven to propel the casting. The other rolls are idlers to confine and guide the casting. After leaving the curved roll-rack, the casting passes through a straightener, and subsequently is severed to discrete lengths. The casting is subject to intense cooling after it leaves the mold, and solidifies throughout before it is severed.

All the rolls of a machine of this type are subject to severe operating conditions, since they are in direct contact both with the hot casting and with the water sprays used to cool the casting. Consequently it is necessary to remove, inspect and replace rolls on a regularly scheduled basis. In most installations it is necessary also to reposition or remove and replace rolls whenever the machine is adjusted to change the casting thickness.

An object of our invention is to provide an improved roll-mounting construction which facilitates withdrawing or inserting idler rolls of a roll-rack, applicable particularly but not limited to a curved roll-rack.

A more specific object is to provide a roll-mounting construction in which top and bottom idler roll-clusters can be withdrawn from or inserted into a supporting structure from the concave side of a curved roll-rack merely by removing two keys from their slots without otherwise dismantling the rack. The terms "top cluster" and "bottom cluster" refer to the roll-clusters closer to the concave side and convex side respectively of a curved roll-rack.

A further object is to provide roll-clusters, the frames of which are readily engaged and supported by a mechanical extractor, whereby the extractor can withdraw the clusters from the concave side of a curved roll-rack or replace them from the same side.

A further object is to provide idler roll-clusters which facilitate adjusting a roll-rack to accommodate castings of different thicknesses.

In the drawing:

FIG. 1 is a diagrammatic side elevational view of a curved roll-rack in which the idler rolls are mounted in accordance with our invention;

FIG. 2 is a section on a larger scale on line II—II of FIG. 1;

FIG. 3 is a vertical sectional view of the assembled clusters taken on line III—III of FIG. 2;

FIG. 4 is a section on line IV—IV of FIG. 2; and

FIG. 5 is a fragmentary end elevational view from the right of FIG. 2.

FIG. 1 shows diagrammatically a portion of a continuous-casting machine which may be of known construction apart from the idler roll mountings. The machine includes a straight vertical roll-rack 10, a bending-roll unit 12, a curved roll-rack 13 and a straightener 14. A continuously formed casting C, which comes from a mold, not shown, travels along the path defined by the various rolls and through the straightener. The bending-roll unit imparts a curvature to the travel casting, after which the curved roll-rack changes its direction of travel from vertical to horizontal, and the straightener removes the curved set. Various rolls among those shown may be driven to propel the casting, and the others are idlers to confine and guide the casting. If a rigid starter bar is used, the upper portion of the curved roll-rack includes a switch section (not shown) which lets the starter bar descend vertically. The curved roll-rack illustrated defines a path which is a circular arc, but the arc can be of other shape.

The curved roll-rack includes a housing 15 in which idler rolls are mounted in a plurality of sets of top and bottom clusters 16 and 17. Driven rolls 24, mounted in any desired manner, are interspersed between various clusters of idler rolls. The machine is shown as equipped with an extractor 30 pivotally mounted at the concave side of the curved roll-rack for withdrawing and inserting the roll-clusters and likewise the driven rolls. The extractor illustrated is constructed as shown and claimed in Gallucci application Ser. No. 236,915 filed coincidentally with the present application, but other forms of extractor may be used.

As FIGS. 2 to 5 show, the housing 15 includes opposed flat side plates 31 and a plurality of transverse box-like base members 32 extending between the edges of the side plates at the convex side of the curved roll-rack behind each set of top and bottom clusters 16 and 17. Each base member 32 carries a respective pair of seats 33 fixed thereto at its opposite ends. A respective pair of opposed straps 34 are fixed to the inside faces of the side plates 31 alongside each pair of clusters. Each top cluster 16 includes a frame formed of opposed chocks 35, spaced transverse plates 36 attached at their opposite ends to the chocks, and blocks 37 fixed to the edges of the plates and extending therebetween at their opposite ends. A pair of top rolls 38 are journaled in suitable bearings within chocks 35. Each bottom cluster 17 includes a frame formed of opposed chocks 39 and a crossbar 40 attached at its opposite ends to the chocks. A pair of bottom rolls 41 are journaled in suitable bearings within chocks 39. The chocks 35 and 39 carry tabs 42 which engage the edges of the proximate straps 34 and thus slidably support the clusters on the straps. Blocks 37 have openings 43 through which the straps extend (FIG. 5). The crossbar 40 bears against seats 33.

Compression springs 46 are housed in the space between plates 36 of each top cluster frame adjacent opposite ends thereof. The chocks 39 of each bottom cluster frame have respective lugs 47. Spring rods 48 bear at their ends against the lugs 47 and extend between the two top rolls 38 and at their opposite ends carry spring support discs 49, against which the ends of springs 46 bear (FIG. 4). The other ends of springs 46 bear against the respective blocks 37. As best shown in FIGS. 2 and 4, stepped transversely slidable keys 50 are mounted in guideways 51 on the outer faces of the respective blocks 37. The straps 34 have elongated slots

52 which receive keys 50 at any of their steps, three of which are illustrated. Thus the keys hold the clusters in the housing and the springs 46 urge the two clusters of each set apart and provide sufficient pressure on the keys to hold them in position. Adjustment of keys 50 to positions in which different steps are received within slots 52 changes the spacing between the top and bottom rolls 38 and 41 to accommodate castings of different thickness. Accurate gapping of the rolls can be effected by inserting shim plates on the keys or tapered wedge adjustment.

Blocks 37 have integral apertured lugs 53 located on opposite sides of keys 50 (four lugs 53 per cluster). Keys 50 have respective outwardly projecting pins 54. The lugs 47 on each bottom cluster frame have openings 55 arranged similarly to the openings in lugs 53. The keys and lugs are accessible at the concave side of the roll-rack. To withdraw any set of clusters 16 and 17 from the housing 15, we slide the two keys 50 inwardly toward the center of the top cluster 16 until the keys are disengaged from the straps 34. We then pick up the top cluster by its lugs 53 and pull it from the housing. Next we pick up the bottom cluster by its lugs 47 and pull it also from the housing.

The extractor shown in the Gallucci application includes key-operating means engageable with pins 54, and pins arranged to enter the openings in the lugs 47 and 53, and it can swing about a pivotal mounting into alignment with any of the clusters of the curved roll rack. Hence we prefer to use this form of extractor for withdrawing and inserting our roll-clusters. Nevertheless it is apparent we can use other tools for these operations. When we wish to adjust the clusters for castings of different thickness, we can use the extractor to reposition the keys 50, or we can move the keys manually with a suitable tool. In either event it is unnecessary to remove the roll clusters to make thickness adjustments.

From the foregoing description it is seen that our invention affords a roll mounting of simple construction which enables the idler rolls of a curved roll-rack to be withdrawn, inserted or adjusted as to their position readily from the concave side of a roll-rack. Our mounting can be used also for idler rolls of a straight roll-rack or of a bending-roll unit.

We claim:

1. In a roll-rack which includes a housing formed of opposed side plates and base members extending between said side plates at one edge thereof, the combination therewith of an improved construction mounting idler rolls in said housing, said construction comprising:

- a plurality of top roll-clusters and a plurality of bottom roll-clusters arranged in sets in said housing;
- each of said top roll-clusters including a frame and rolls journaled in said frame;
- each of said bottom roll-clusters including a frame and rolls journaled in said latter frame;

means in said housing slidably supporting the frames of each set of clusters;

spring means urging the top and bottom clusters of each set apart;

the frames of said bottom clusters bearing against said base members; and

disengageable means at the side of said housing opposite said base members holding said clusters in said housing;

said clusters being arranged to be withdrawn from the side of the housing opposite said base members.

2. A combination as defined in claim 1 in which said roll-rack is curved, said base members are located at the convex side of the rack, and said clusters are withdrawn at the concave side.

3. A combination as defined in claim 1 in which the means slidably supporting said frames includes straps fixed to the inside faces of said side plates, and in which said disengageable means cooperates with said straps.

4. A combination as defined in claim 1 in which said disengageable means includes transversely slidable keys mounted on the frame of said top cluster, and co-operating means fixed with respect to said side plates receiving said keys.

5. A combination as defined in claim 1 in which the means slidably supporting said frames includes straps fixed to the inside faces of said side plates, and in which said disengageable means includes transversely slidable keys mounted on the frame of said top cluster, said straps having openings receiving said keys.

6. A combination as defined in claim 5 in which said keys have steps, any of which can be received in said openings to adjust the spacing between the rolls of said top and bottom clusters.

7. A combination as defined in claim 5 comprising in addition spring means mounted within said clusters urging the top and bottom clusters apart and providing pressure on the keys to hold them in position.

8. A combination as defined in claim 5 comprising in addition lugs on the top and bottom clusters engageable with means for withdrawing said clusters.

9. A combination as defined in claim 5 in which the frame of said top housing includes opposed chocks, said first-named rolls being journaled in said chocks, spaced transverse plates attached at their ends to said chocks, and blocks fixed to the edges of said transverse plates and extending therebetween at their opposite ends, said keys being mounted on said blocks, said combination comprising in addition compression springs housed between said transverse plates, and spring rods engaging the frame of said bottom cluster and having discs engaging said springs, whereby said springs bear against said blocks and said discs to urge the top and bottom clusters apart and provide pressure on the keys to hold them in position.

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