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Reichrath

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[54] **ROLLING MILL FRAMES**

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[52] **U.S. Cl.** **72/238**

[51] **Int. Cl.²** **B21B 31/08**

[58] **Field of Search** ..... 72/238, 239, 237, 241; 254/29 A

[56] **References Cited**

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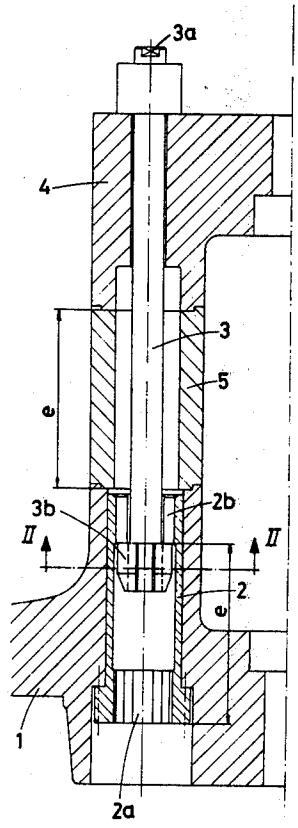
[57] **ABSTRACT**

In a rolling mill frame with composite stands each stand has a lower and an upper stand part. The stand parts are connected together by a pair of tie rods, both ends of each tie rod being supported on the lower and upper stand parts in a stress transmitting manner. The upper stand part can be displaced to permit rolls supported in the mill frame to be changed. Each tie rod is releasable by means of a bayonet type fast engagement connection and each such connection is disposed adjacent a separation point of one of the stand parts.

7 Claims, 4 Drawing Figures



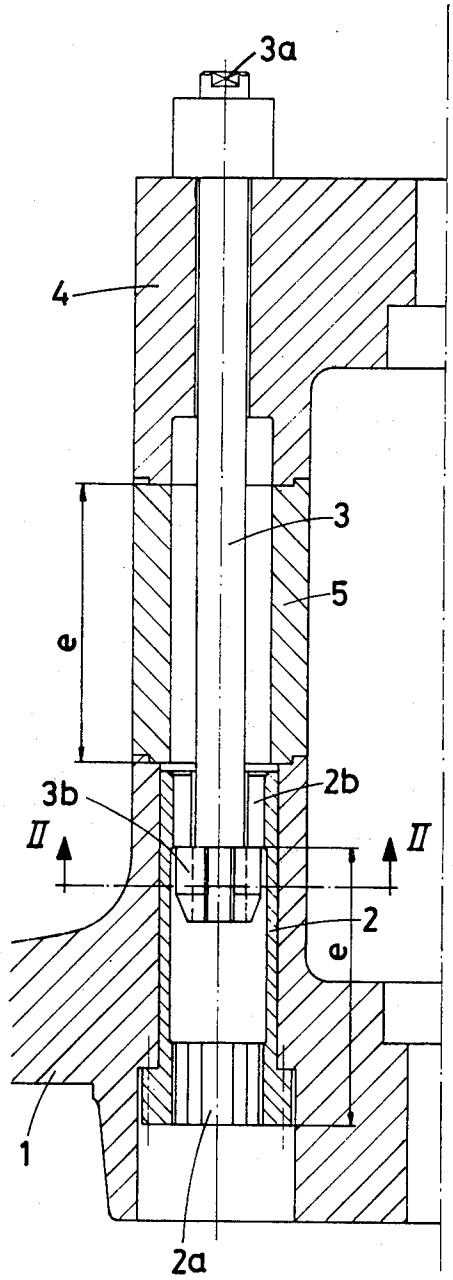
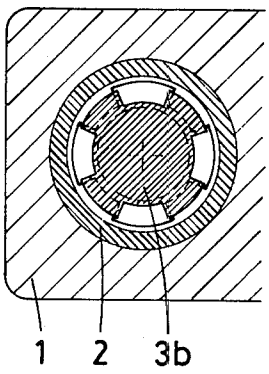


Fig. 1

Fig. 2



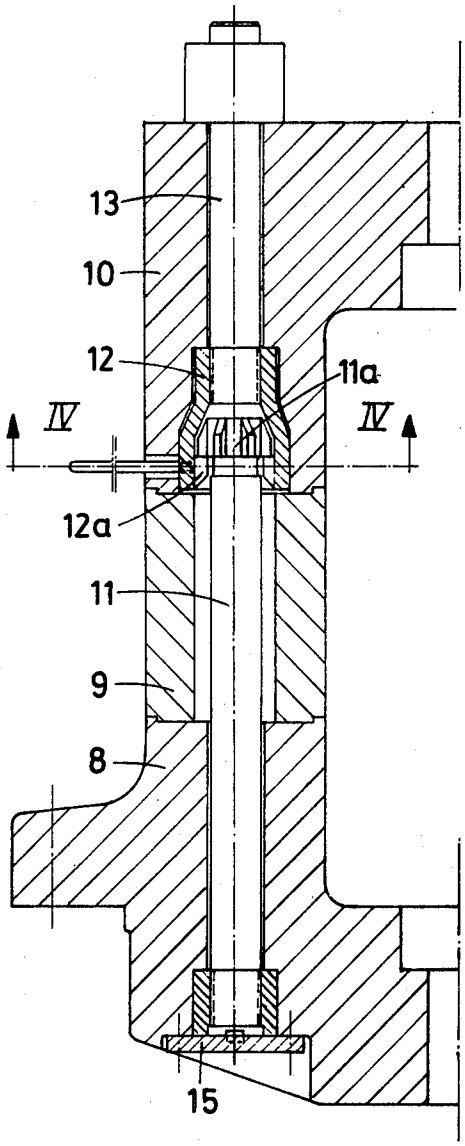


Fig. 3

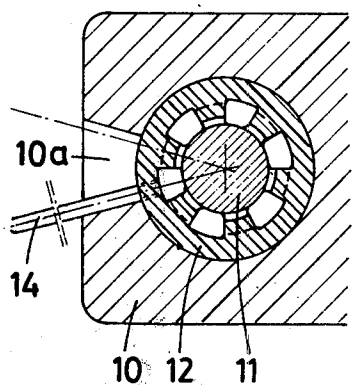


Fig. 4

ROLLING MILL FRAMES

This invention relates to rolling mill frames and is more particularly concerned with a rolling mill frame having composite stands, each stand having a lower and an upper stand part which parts are connected together by a pair of tie rods, wherein both ends of each tie rod are supported on the lower and the upper stand parts in a releasable stress-transmitting manner and wherein the upper stand part can be displaced to permit rolls supported in the mill frame to be changed.

In constructions known heretofore, the upper part of the rolling mill stand must be lifted to a position above the upwardly projecting tie rods when rolls are to be changed. In this case the normal height of the running track of a crane or hoist used in the roll changing operation tends to hamper the conversion of the rolling mill frame. After the upper part of this stand has been lifted off, the exposed tie rods are subject to the risk of damage, e.g. by a load carried by the crane or hoist; furthermore difficulties arise when the upper stand part is to be engaged again with the tie rods which project high above the lower stand part.

These disadvantages are avoided by the invention by means of bayonet-type rapid engagement connections one of which is disposed adjacent each respective separating point between the stand parts. If the bayonet-like rapid engagement connections are disposed in the lower stand part, the upper stand part together with the tie rods can be lifted off after this connection has been released. The head of each tie rod is toothed to form an inner member of a bayonet connection and projects in this case downwardly from the upper stand part.

If the bayonet-type rapid engagement connections are disposed in the upper stand part, the tie rods remain in the lower stand part after this connection has been released and the upper stand part lifted off. The bayonet-type toothed head of each tie rod projects in this case upwardly from the lower stand part.

Improved operating conditions for a works crane or hoist result from both arrangements. Furthermore conversion of the rolling mill frame can be effected more rapidly thereby.

Complicated machining operations for producing the appropriate co-operating bayonet-type toothed outer members in the respective stand parts are also avoided.

The outer member may be disposed in a sleeve arranged in one of the stand parts, and the sleeve may be rotatable to permit the outer member to be moved into a desired position for actuating the bayonet-type rapid engagement connection, and in this case a hand grip may be provided on the sleeve, the hand grip extending through a slot in the respective one stand part and the rotary positioning thereof being determined by the length of the slot. In this case the tie rod is attached to the respective other stand part.

The rotatable sleeve may be kept short by attaching it to a tie rod member which extends through the one stand part. As the tie rod member can have a smaller diameter than the sleeve, less material need be removed from the stand part for providing the corresponding bore and the active crosssectional area of the stand part relatively increased thereby.

Two constructional examples of the invention are described below with reference to the accompanying drawings, in which:

FIG. 1 illustrates a longitudinal section through one side of a stand with tie rod pre-stressing and a bayonet-type rapid engagement connection located in the lower stand part;

FIG. 2 illustrates a section on the line II—II in FIG. 1, on an enlarged scale;

FIG. 3 illustrates a longitudinal section through one side of a stand with tie rod pre-stressing and a bayonet-type rapid engagement connection located in the upper stand part; and

FIG. 4 illustrates a section on the line IV—IV in FIG. 3, on an enlarged scale.

According to FIG. 1, a composite stand of a rolling mill frame comprises and upper part 4, a middle part 5 and a lower part 1, the parts being connected together by means of of two tie rods 3, only one of which is shown in the drawing. A bayonet-type rapid engagement connection is disposed in the lower frame part 1, and comprises an inner member consisting of the bayonet-type toothed head 3*b* of this tie rod 3, and two outer members 2*a* and 2*b* of the bayonet-type rapid engagement connection which are unitary with an axially fixed sleeve 2 and are located at a mutual spacing *e* which corresponds to the constructional height of the middle part 5.

In the present example, the middle part 5 is removable.

When the middle part 5 is in position, as shown in FIG. 1, the head 3*b* is engaged with the outer member 2*b*, but if the middle part 5 has been removed to decrease the constructional height of the rolling mill frame, the head 3*b* comes into engagement with the outer member 2*a* to complete the bayonet-type fast engagement connection.

For effecting a roll change, each tie rod 3 is relieved of its tension and is then rotated by application of a tool to its end 3*a*, thereby to release the bayonet-type rapid engagement connection. Thereupon the upper stand part 4 together with the tie rods 3 is lifted off, leaving the bayonet-type toothed head 3*b* of the tie rods 3 projecting downwardly from the upper stand part 4.

FIG. 2 illustrates a constructional example of the teeth of the bayonet-type rapid engagement connection.

According to FIG. 3, the rolling mill frame comprises composite stands each of which has an upper part 10, a middle part 9 and a lower part 8, which parts are connected together by means of two tie rods 11 only one of which is shown in the drawing. The bayonet-type rapid engagement connection is disposed in the upper stand part 10, an outer member 12*a* of the bayonet-type rapid engagement connection being connected to a rotatable sleeve 12. The sleeve 12 is attached to a tie rod member 13 which extends through the upper stand part. A hand grip 14 extends through a slot 10*a* of the upper stand part and permits rotation of the sleeve and thus the release of the bayonet-type rapid engagement connection, the length of the slot determining the fully engaged and fully disengaged positions. When the rapid engagement connection is released, the upper stand part 10 together with the sleeve 12 and the upper tie rod member 13 attached to the latter, is lifted off; in this case the tie rod is axially fixed and remains in the lower stand part 8; the bayonet-type toothed head 11*a* of the tie rod 11 projects upwardly from the lower stand part and through the middle part 9 which remains in position. Axial fixing of the tie rod 11 is effected in

the present constructional example by a plate **15** which covers and closes the bottem end of the bore in the lower stand part through which the tie rod extends and prevents it from falling out of the stand part when the connection is released.

In addition to the hand grip **14, FIG. 4** illustrates one constructional example of the teeth of the bayonet-type rapid engagement connection.

What is claimed is:

1. In a rolling mill frame, two composite stands, each of said stands comprising a lower stand part, an upper stand part, said upper stand part engaging said lower stand part at separation points, two tie rods means extending through said stand parts for connecting said stand parts together in a stress-transmitting manner, said upper stand part being removable for permitting rolls supported in said mill frame to be changed, and bayonet-type engagement connection means for permitting said tie rod means to be released, one of said connection means being disposed adjacent each of said separation points of one of said stand parts.

2. In a rolling mill frame, two composite stands, each of said stands comprising a lower stand part, a middle stand part, an upper stand part, said stand parts being super-imposed and adjacent stand parts engaging one another at separation points, two tie rod means extending through said stand parts for connecting said stand parts together in a stress-transmitting manner, said upper stand part being removable for permitting rolls supported in said mill frame to be changed, and bayonet-type engagement connections means for permitting said tie rod means to be released, one of said connection means being disposed adjacent each of said separation points of one of said lower or upper stand parts.

3. A rolling mill frame having composite stands, each stand comprising a lower and an upper stand part, which parts are connected together by a pair of tie rods, wherein both ends of each tie rod are supported on the lower and upper stand parts in a stress-transmitting manner, wherein the upper stand part can be displaced to permit rolls supported in the mill frame to be changed, wherein each tie rods is releasable by means of a bayonet-type engagement connection, and wherein each bayonet-type fast engagement connection is disposed adjacent a separation point of one of the stand stand parts.

4. A rolling mill frame according to claim **2**, having a displaceable middle part, wherein two outer members of the bayonet-type engagement connection are unitary with the sleeve and are mutually spaced at a distance corresponding to the constructional height of the middle part, and wherein the sleeve is disposed in the lower stand part.

5. A rolling mill frame according to claim **1**, wherein an outer member of each bayonet-type engagement connection is unitary with a sleeve which is axially fixed in one of the stand parts.

6. A rolling mill frame according to claim **5** wherein the sleeve is rotatable by means of a hand grip extending through a longitudinal slot in the upper stand part.

7. A rolling mill frame according to claim **6**, wherein the sleeve is connected to a tie rod member which extends through the upper stand part.

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