MULTI-ROLL STANDS

Fig. 1
MULTI-ROLL STANDS
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ABSTRACT OF THE DISCLOSURE

A multi-roll stand, with two positively driven backing rolls and with working rolls frictionally driven by the backing rolls, the working rolls being displaced out of the vertical plane containing the axes of the backing rolls, and supported in the direction of this displacement by intermediate rolls and supporting rollers journalled on supporting bridges respectively. The supporting bridge and hence the supporting rollers can be swung out of contact with the intermediate rollers. Force is applied horizontally to the bearings of the working rolls to support the working rolls in the opposite direction.

This invention relates to a multi-roll stand, with two positively driven backing rolls, and with working rolls frictionally driven by the backing rolls, these working rolls being shifted out of the plane containing the axes of the backing rolls, and bearing, in the direction of their displacement, on intermediate rolls and supporting rollers journalled on rigid supporting bridges, respectively.

In the case of known designs, the supporting rollers are journalled on a supporting bridge rigidly connected with the housings. On the opposite side, the working rolls on their bearings are provided with a pressing appliance, releasable for changing the rolls, and acting in the direction towards the supporting rollers. This arrangement has the disadvantage that the position of the working rolls is dependent upon the diameter of the other rolls, and therefore changes as wear occurs.

Working rolls and backing rolls must be parallel to one another. This requirement must be fulfilled all the more accurately, the smaller the diameter of the working rolls in relation to their length, and the thinner the rolled stock is. Since however the position of the working rolls is determined by the supporting bridge, whereas the position of the backing rolls is determined by the opposite force-closed bearing of their chocks in the window aperture of the housing, it is necessary that the bearings, located far apart on the roll housings and the supporting bridges, must be absolutely parallel to one another. This however is attainable only by expensive machining.

With this invention the disadvantages are obviated. In addition an improvement in the constructional and maintenance possibilities is aimed at.

According to the invention, this is attained by the feature that the supporting bridges are so arranged between the housings that they can be swung away from the intermediate rolls.

Further, because the working rolls and the backing rolls are collectively supported, by way of the individual chock, on a contact surface of the housing window, their parallelism to one another is ensured in a simple manner. Owing to the fact that the working rolls are supported directly on the fixed contact surface, they are always held in the same vertical plane, independent of the diameters of the other rolls which are variable due to wear.

In a further development of the invention, the axes of the supporting rollers are carried on supporting plates, which are connected to the supporting bridge. The appliance for keeping the supporting rollers in contact with the intermediate rolls may thus be omitted. For changing rolls, or for maintenance, the intermediate rolls and the working rolls are rendered freely accessible by simply swinging the supporting bridge out of the way.

According to a further feature of the invention, the supporting bridges are provided at their ends with carrying arms, which are rotatably supported upon eccentric bolts accommodated in the housing, the end portions of the supporting bridges being constructed as pivots, about which is rotatably supported a ring with a flattening, with which is associated the inclined surface of a wedge, vertically slideable on the housing and connected with an adjusting element. In this way the position of the supporting bridge can be accurately adjusted in a vertical direction by rotating the eccentric bolt and in a horizontal direction by shifting the working rolls. A further advantage according to the invention is the fact that the bearings of the working rolls are arranged opposite to the supporting rollers on claws, which are vertically displaceable, and are guided on supporting blocks secured to the chocks. A transmission lever is fulcrummed on the supporting block its rear side is acted on by a piston of a pressure-oil cylinder arranged horizontally in the supporting block, and its front side upon a projection of the vertically displaceable claw. In this way the working roll is held against the backing roll even when the rolled stock has run out.

One constructional example of the invention is illustrated in the accompanying drawings, in which:

FIG. 1 shows a side view, represented in section, of a roll stand; and

FIG. 2 shows a plan view, also in section.

Two working rolls 1 of a multi-roll stand are each supported perpendicularly on their peripheral surface against a backing roll 2, and horizontally, by way of intermediate rolls 3 and 4, on supporting rollers 5, the working rolls being displaced out of the common vertical plane of the axes of the backing rolls 2 in the direction of the supporting rollers 5. The supporting rollers 5 are journalled on supporting plates 7, connected with an upper supporting bridge 6 and a lower supporting bridge 6'. The supporting bridges 6 and 6' are provided at their ends with carrying arms 8 and 9, and are rockably journalled with their bearings 10 on eccentric bolts 12 arranged on the housings 11. Endwise the supporting bridges 6 and 6' are constructed as journals, upon each of which is rotatably supported a ring 13 of adjustable diameter, with a contact surface 14. With the contact surface 14, adjustable in this way in its inclination against a resistance, is associated a wedge 15, vertically displaceable on the housing, and connected by way of a rod 16 with the piston of an adjusting cylinder 17. By displacing the wedges 15, the supporting bridge 6 or 6' can be rocked, thus compensating for the wear of the roll. Thus the ring 13 compensates for the altered inclination of the supporting bridge 6 or 6', so that a satisfactory bearing on the wedge 15 is always ensured. By rotating the eccentric 12, the vertical position of the supporting rollers 5 can also be readjusted.

For changing the rolls, the supporting bridge can be rocked out of the contact range by completely removing the wedges, the lower supporting bridge 6' dropping by gravity and being held by the upper edges of the lower wedge, and the upper supporting bridge 6 being carried along by the upper wedges, by way of a resilient tensile strip 18 in each case.

The intermediate rolls 3 are journalled in rockable arms 19, 19', in which also the intermediate rolls 4 are journalled in slide-blocks 20 displaceable therein. In the arms 19 are arranged compressed-air cylinders 21 which have
on the rear side supporting forks 22 constructed as pistons for centering the bearings of the working rolls in relation to those of the intermediate rolls, which are displaceable. The upper arms 19 are held on the upper chock 23 by a tension spring 24, whereby the intermediate rolls 3 and 4 are prevented from falling down when the supporting bridge is swung out.

For supporting the bearings of the working rolls in the opposite direction claws 25 are provided, which are vertically slideable and are guided in supporting blocks 26 secured to the chocks 23 and 23'. In these supporting blocks are arranged cylinders 27, the pistons 28 of which exert, upon a transmission lever 29 fulcrumed in the supporting blocks 26, a horizontal force which is transmitted as a vertical force directed against the supporting rolls 2 to the claws 25, and thus hold the working rolls 1 against the backing rolls 2 when the rolled stock has run out.

Between the upper and lower arms 19 and 19' are arranged pressure-fluid cylinders 30, which support the upper arms 19, and prevent the intermediate rolls 3 and 4 falling down when the working rolls 1 are being dismantled.

We claim:

1. A multi-roll stand comprising an upper and lower set of rolls, each set containing: roll housings; a positively driven backing roll; a working roll fractionally driven by the backing roll, the axes of both upper and lower working rolls being displaced out of the vertical plane containing the axes of both upper and lower backing rolls; a supporting bridge extending between the roll housings; supporting rollers journalled on the supporting bridge; intermediate rolls interspersed between the working roll and the supporting rollers, the intermediate rolls and working roll being journalled as a unit so that the axes of the working roll and intermediate rolls are maintained in the same plane; and means for mounting the supporting bridge on the housings so that the bridge and corresponding supporting rollers can be pivoted completely out of contact with the intermediate rolls so that said unit is easily accessible, the mounting means including vertical and horizontal adjustment means to selectively position the bridge and supporting rollers in both the vertical and horizontal plane.

2. A multi-roll stand as claimed in claim 1 wherein the mounting means further includes a carrying arm at each end of the supporting bridge; said vertical adjustment means being an eccentric bolt accommodated in each housing, the carrying arms being rotatably supported and vertically adjusted by these bolts; the end portions of the supporting bridge being constructed as journals and a ring rotatably supported upon each of the journals, each ring being formed with a flattened portion; said horizontal adjustment means being a vertically displaceable wedge on each housing so that each of the flattened surfaces normally bears against the inclined surface of one of the wedges and vertical movement of the wedge substantially horizontally adjusts the bridge and supporting rollers.

3. A multi-roll stand as claimed in claim 1 wherein the supporting bridge has a plurality of supporting plates connected thereto, the supporting rollers being journalled between these plates.

4. A multi-roll stand as claimed in claim 1 and further comprising chocks for the backing roll; supporting blocks secured to the chocks; claws slideable substantially vertically in the supporting blocks, and bearing against the journals of the working roll in a direction opposite to the bearing force exerted by the supporting rollers; transmission levers fulcrumed on the supporting blocks; cylinders arranged in the supporting blocks and pistons slideable in the cylinders so that the pistons act on the transmission levers and vertically displace the claws.

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