This invention relates to the metal working industry and is generally concerned with the rolling mill stands in a rod, bar merchant or billet mill.

More particularly, the invention relates to an improved means for mounting stripper guides in relation to the rolls in the stands of a rod mill. Stripper guides have long been known to the industry. Their purpose is to insure that the leading end of the work (hereinafter referred to as rod, for convenience) advancing rapidly from one pair of rolls to the next pair of rolls will leave each pair of rolls in the direction of the pass line. The stripper guide achieves this result by being positioned closely adjacent the discharge side of the operating grooves of the rolls. Thus as the rod leaves the nip of the rolls, it is positively prevented from following either the groove of the upper roll or the groove of the lower roll. In the absence of stripper guides, the rod occasionally does not free itself, but instead follows around one of the other of the rolls to cause a cobbler. The stripper guides effectively direct the rod along the pass line, leading it into the succeeding guides, from which the rod passes on to the receiving guide of the next finishing stand.

According to the prior art practices, the stripper guides have been mounted on transversely extending members which have been supported by the roll housing. Under this old practice, it was necessary to adjust each stripper guide to its proper position with respect to its related roll groove whenever a new pair of rolls was placed in the housing and also whenever any adjustment was made thereto of either the guides or the rolls. This was a slow operation, as close accurate adjustment is necessary if the stripper guide is to work properly. Furthermore, if the mill was a two or three strand mill, the time required for locating and adjusting the stripper guides was multiplied by two or three, further delaying the start of the rolling operation.

A further serious disadvantage of the prior practice was that when the pass line was shifted to the next pair of grooves, which is necessary at relatively frequent intervals, then it was correspondingly necessary to reposition and re-adjust the stripper guides to the position of the new pass line, all of which further delayed restarting of the mill with a consequent loss of production.

The present invention takes a totally new approach which greatly reduces the down time. In fact, it completely eliminates the time lost previously in making stripper guide adjustments. The reason for this is that the stripper guides are now mounted on a transverse bar which is directly affixed to the chocks of the roll. This permits the stripper guides to be adjusted with respect to the grooves of the roll while the roll is out of the housing in the roll shop. In other words, when new rolls are mounted in the housing the stripper guides have already been accurately adjusted with respect to the roll grooves so that no adjustment time is required after the new rolls have been placed in the housing. This is true whether it is a one, two, three or four strand mill.

By having the stripper guides mounted on a support attached to the chocks and adjusted in the shop, it is now possible to have an individual guide for each groove. Thus when the pass line is shifted from one groove to the next, no adjustment of stripper guides is necessary as the stripper guides in the next groove are already in position. Putting it another way, the mill may now be operated as far as down time is concerned as if there were no stripper guides at all.

The stripper guides obviously take various configurations according to the configuration of the grooves with which they are associated. Furthermore, in some cases where the grooves are closely adjacent each other it may be more convenient to have two adjacent stripper guides formed from a single block of metal. This is possible since the spacing of the grooves is of known dimension, and accordingly a plurality of stripper guides formed from a single block may be made with lateral spacing that agrees exactly with the spacing of the grooves.

Various means may be used for securing the stripper guides to the transversely extending bar, but it will be understood that the invention is not limited to the use of any specific means for mounting the guides on the bar. It is also desirable in some cases to provide adjustability so that the battery of stripper guides may be accurately positioned with respect to grooves having somewhat different spacing.

This novel means of mounting the stripper guides on a bar extending from one chock to the other is possible since it is now common to use thrust bearings associated with the roll necks and chock bearings which preclude axial movement of the chocks with respect to each other. In other words, the chocks, when mounted on the roll necks, remain thereafter a fixed distance apart, and it is therefore possible to mount a bar in rigid connection with the chocks, the bar extending across the face of the roll. Since the bar cannot move axially with respect to the roll, it follows that once the stripper guides are aligned with the grooves and fixed in position on the bar they remain in this position regardless of any subsequent adjustment that may be made of the roll in the housing.

The invention will be more clearly understood as the description proceeds with the aid of the accompanying drawings in which:

FIG. 1 is a side elevation (broken away at its mid-section) of the upper and lower rolls of any selected stand with their associated chocks and stripper guides mounted on transversely extending bars affixed to the chocks;

FIG. 2 is a fragmentary vertical section taken on the line 2—2 of FIG. 1 to enlarged scale showing upper and lower stripper guides mounted on the transversely extending bars and in position with respect to one pair of grooves in the rolls;

FIG. 3 is a view similar to FIG. 1 in which the stripper guides and the transversely extending bars are of modified configuration to cooperate with a deeper type of groove;

FIG. 4 is a fragmentary vertical section taken on the line 4—4 of FIG. 3 showing other securing means; and

FIG. 5 is a fragmentary vertical elevation showing another type of stripper guide useful with rolls having deep grooves; and

FIG. 6 is a vertical section taken on the line 6—6 of FIG. 5.

The invention may take various embodiments, some of which are shown in the drawings, but others will suggest themselves to persons skilled in the art.

Referring first to FIGS. 1 and 2, the stripper guides are shown in use with a pair of horizontal rolls, but it will be understood that the invention is equally applicable to vertical rolls. The upper and lower rolls 2 and 4 are mounted for rotation in conventional manner in upper chocks 6 and lower chocks 8, which chocks are supported in conventional manner in the roll housing (not shown).
A bar 10 extends transversely between chocks 6 and a bar 12 extends transversely in similar fashion between chocks 8. These bars are on the discharge side of rolls 2 and 4. Any suitable means for attaching the bars 10 and 12 to their respective chocks may be used. It is preferable, although not necessary, that means for adjusting the bars both horizontally and vertically be provided. One such means is shown in FIG. 1, in which bars 10 and 12 have vertically extending slots 14 and 16 which, in cooperation with the bolts 18 and 20, provide for vertical adjustment. The right-hand end of the lower ends of the bars, the horizontal slots 22 and 24, cooperating with slotting means 26 and 28, permit horizontal adjustment to the extent of the horizontal clearance between bolts 18 and 20.

The cross-sectional configuration of bars 10 and 12 through the portion adjacent the rolls 2 and 4 may be seen in FIG. 2. To the lower side of bar 10 is affixed a plurality of upper stripper guides 30 and to the upper side of bar 12 is affixed a plurality of lower stripper guides 32. In the construction shown, the stripper guides are formed in pairs from a single block of suitable material, ordinarily steel, with the lateral spacing of each pair of guides in each block being exactly the same as the spacing of grooves 34 and 36 of the upper and lower rolls.

The upper stripper guides 30 are shown in cross-section in FIG. 2 wherein crosswise extending grooves 38 under-cut as 40 cooperate with the bottom portion 42 of bar 10. A set screw 44 holds each of the stripper guides in position on bar 10 after the block has been correctly positioned with regard to the grooves 34 and 36. When the stripper guides are positioned correctly, their ends 46 should bear lightly against or just clear the surface of grooves 34 and 36. In this way, the rod which has lettered the roll pass in the direction of arrow 49 will be effectively stripped from both grooves 34 and 36 to pass on through the space 50 between the upper and lower stripper guides in the direction of the next pair of rolls. Ordinarily, upper and lower stripper guides 30 and 32 are identical and may be used interchangeably.

From the foregoing description, it is apparent that when a roll and its related chocks are assembled in the roll shop and the stripper guides adjusted at that time with respect to the roll grooves, further handling of the roll, such as its positioning in the roll housing and its subsequent adjustment, either by hand or axially, will have no effect on the position of the stripper guides with respect to their related grooves. Thus, for example, when the pass line is shifted from pass 52 to the adjacent pass 54 no adjustment of the stripper guides is required. In this way, down time for stripper guide adjustment is completely eliminated.

A modified form of the invention is shown in FIGS. 3 and 4, but the principles of operation remain the same. In this construction, the rolls 60 and 62 have deeper grooves 64 and 66 which are spaced axially a greater distance than the grooves 34 and 36 shown in FIGS. 1 and 2. The upper and lower chocks 68 and 70 mounted on the roll necks in the usual manner are held against axial movement with respect to the rolls by conventional thrust bearings (not shown). The bars 72 and 74 have permanent non-adjustable mountings on the facing ends of the chocks comprising spaced ears 76 on the upper chocks and spaced ears 78 on the lower chocks. These cooperate with ears 80 on the ends of bars 72 and ears 82 on the ends of bar 74 to be held securely in position respectively by the pins 84 and 86. The individually formed upper and lower stripper guides 88 and 90 are identical and are made of correct dimensions to fit closely against the grooves 64 and 66. The stripper guides are held in position on bars 72 and 74 by bolts 92 and 94. If the parts are accurately made, means for adjustment in the direction of the axis of the roll is unnecessary. However, it is preferable to have vertical adjusting means which may take the form of removable shims 96 and 98 so that, as the roll is gradually reduced in diameter over its life, removal of one or more shims will enable each stripper guide to be brought again into close proximity with its respective groove.

It will be apparent in the constructions shown in FIGS. 3 and 4 that the rolls 60 and 62 may be adjusted at will after installation in the roll housing without requiring any adjustment of the stripper guides. The stock entering in the direction of arrow 100 (see FIG. 4) is compelled by the stripper guides to continue in a straight line toward the next pair of rolls.

Still another embodiment is shown in FIGS. 5 and 6. Here the rolls 110 and 112 are mounted in their respective chocks 114 and 116. Cross bars 118 and 120 extend horizontally across the face of the rolls, being secured to the chocks by bolts 122 and 124. In this construction, it has been found desirable to make the stripper guides in pairs from a single block of metal, and in addition to provide for some vertical and horizontal adjustment. As the rolls are re-cut, the grooves continually deepen, and therefore in certain types of roll constructions a reasonable degree of adjustability should be provided so that the stripper guides can be set up in the roll shop in correct stripping position.

In FIGS. 5 and 6, the upper stripper guides 126 have upwardly extending portions 128 adapted to cooperate with bolts 130 which pass through slots 132 recessed into the lower edge of bar 118. Since there are two of these horizontal bolts 130 for each of the upper stripper guides 126, the stripper guide may be readily adjusted vertically and held in the new position. To strip away grooves that cannot shift from this adjusted vertical position, a bolt 134 passing through aligned vertical holes in bar 118 and the central portion of stripper guide 126 may be used in the manner shown.

An identical arrangement is made with respect to lower stripper guide 136. Here similar bolts 130 and 134 cooperating with stripper guide 136 in the manner already described with respect to stripper guide 126 effectively hold the stripper guide in adjusted position.

It will also be understood that the bars supporting the stripper guides, such as bars 10 and 12 in FIGS. 1 and 2, for example, could be made integral with the stripper guides 30 and 32. Adjustment of the guides laterally and vertically could be satisfactorily achieved by adjusting means connecting the bars to the chocks, one such means being illustrated in FIG. 1.

As previously mentioned, other embodiments of the invention may be made utilizing the above enumerated principles which, however, it is intended will be within the scope of the appended claims.

We claim:

1. In a rolling mill which includes a pair of chock supported rolls, each of which is one or more grooves therein aligned with corresponding grooves in the other, a support extending closely adjacent one of said rolls from one chock to the other, another support extending closely adjacent the other of said rolls from one chock to the other, each of said supports having affixed thereto one or more stripper guides each aligned with a groove of its said roll whereby each said guide will remain in fixed position with regard to its respective groove regardless of adjustment that may be made to each said roll.

2. In a rolling mill which includes a pair of chock supported rolls, and in which each roll has a plurality of aligned grooves therein, a bar extending parallel to one of said rolls from one chock to the other, another bar extending parallel to the other of said rolls from one chock to the other, each of said bars having affixed thereto a plurality of stripper guides closely aligned with grooves in said rolls whereby each said guide will remain in fixed position with respect to its groove regardless of adjustment that may be made to each said roll.

3. In a rolling mill, means for mounting a pair of complementary stripper guides with respect to two adjacent aligned grooves in a pair of cooperating rolls, said means,
comprising a first support extending in fixed relation between the chocks of one roll and a second support extending in fixed relation between the chocks of the other roll, stripper guides mounted opposite each other on said supports in the discharge quadrant of said rolls, the upstream ends of said guides having a configuration which closely matches the shape of said grooves, said ends being located in very close proximity to the groove surfaces whereby subsequent adjustment of said rolls may be made without requiring further adjustment of said guides.

References Cited by the Examiner

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Patent Number</th>
<th>Date</th>
<th>Invention Name</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>136,585</td>
<td>3/1873</td>
<td>Chapman</td>
<td>80-51</td>
</tr>
<tr>
<td>972,219</td>
<td>10/1910</td>
<td>Nye</td>
<td>80-51</td>
</tr>
<tr>
<td>1,017,283</td>
<td>2/1912</td>
<td>Davis</td>
<td>80-51</td>
</tr>
<tr>
<td>1,804,947</td>
<td>5/1931</td>
<td>Palmgren</td>
<td>80-51</td>
</tr>
</tbody>
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