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ROLLER GUIDE FOR ROLLING MILLS

4 Sheets-Sheet 1

Fig 1

Fig 2
This invention relates to roller guides which guide the stock to be rolled into the passes formed between the two cooperating rolls. Such roller guides are often used in rolling-mill operation and have proved suitable particularly with oval passes.

To ensure a perfect guidance of the material to be rolled, the guide rollers of such roller guide cages must be arranged close to the roll gap and must be horizontally and vertically adjustable relative to the pass axis. It is also suitable to arrange the guide rollers that they can easily be replaced during operation. The previously known devices of this type do not meet these requirements.

In a known roller guide the guide rollers are carried in holders which are formed as leaf springs and can be adjusted with the aid of adjusting screws, each of which is associated with one of the holders. This separate adjustability of the roller holders renders the setting of the two rollers to an equal horizontal distance from the pass axis difficult. In this known construction the replacement of the roller holders is also extremely difficult because the guide jaws must be removed first. After the replacement the rollers must always be readjusted, which involves a considerable amount of labor.

A guiding device for bar and strip stock to be rolled is known, in which the distance is adjusted by a unilateral adjustment between the roller holders. In this known construction, however, one of the roller holders is rigidly arranged and only the second roller holder is adjustable relative to the former. This has the disadvantage that where various pass designs are employed the guide rollers cannot be exactly adjusted in a horizontal direction relative to the pass axis because the distance can be varied only by moving the one roller holder relative to the pass axis.

The present invention eliminates the existing drawbacks and provides a roller guide which enables an easy installation and removal, a simple and accurate adjustment to the pass axis and a short distance of the guide rollers from the roll gap.

The invention provides a roller guide for rolling mills, which comprises two guide rollers and spring means arranged to urge said rollers against the material to be rolled and which is characterized by two pivot pins adapted to be arranged symmetrically with respect to the pass axis, two rigid levers each of which has one said pins and carries one said guide rollers, and a common adjusting device simultaneously operatively connected to both said levers and operable to cause a joint symmetrical movement of said rollers in the same sense relative to the pass axis when said pivot pins are symmetrically arranged with respect to said axis.

The adjusting device is desirably formed by a wedge gear, which ensures a uniform, i.e., symmetrical, adjustment of the two roller holders. For certain purposes it is suitable to provide a turnbuckle-type gear instead of the wedge-gear.

The roller holders, which are axially adjustable on their pins, are cramped so that the arms acted upon by the adjusting device are above the top of the casing. In order to enable the guide rollers to be set as closely as possible to the roll gap it is another feature of the invention to form these guide rollers as an outer race of an anti-friction bearing provided on the inside with bearing surfaces for the rolling elements, the inner race of which is shrunk on the shaft which is arranged near the roll gap. The construction of the guide rollers as an outer race of an anti-friction bearing enables the elimination of the usual anti-friction bearing outer race and the reduction of the diameter of the guide rollers or the use of larger rolling elements. This arrangement results in a considerable increase in the useful life of the guide rollers and ensures also a small distance between the roll gap and the guide roller.

Further details and advantages of the invention will become apparent from the following description of embodiments shown by way of example in the accompanying drawing, in which

Fig. 1 is a top plan view showing a roller guide cage according to the invention.

Fig. 2 is a longitudinal sectional view taken on line I—I of Fig. 1.

Fig. 3 is a sectional view taken on line II—II of Figs. 2 and 5a.

Fig. 3a is a sectional view taken on line III—III of Figs. 2 and 5a.

Fig. 4 is an elevation showing one of the two roller holders partly in a sectional view taken on line IV—IV of Fig. 4a.

Fig. 4a is a top plan view of a roller guide cage with the guide jaws partly shown in section.

Fig. 5 is a top plan view similar to Fig. 1 and showing another embodiment of a roller guide cage according to the invention.

Fig. 5a is a vertical sectional view taken on line V—V of Fig. 5.

In Figs. 1 to 4 the two roller holders are indicated at 1 and 1', respectively. The roller holders are constructed as two-armed levers and pivoted on pins 2 and 2', respectively. The pivot pins are formed at their lower ends with centers supported in the base plate 6' of the casing whereas their upper ends are formed with threads 3 or 3' in threaded engagement with the bore of the respective roller holders so that the holders can be axially adjusted by turning the knurled or toothed knob 4 or 4'. The upper ends of the pins are in engagement with centers 5 or 5' screwed into the yoke body 6 of the casing.

The guide jaws 7 and 7' which receive the material to be rolled (from the left when viewed as in Fig. 2) are inserted between the yoke 6 and the base plate 6'.

It is apparent from Fig. 4 that each roller holder is cramped so that the arms carrying the roller 8 is in exact alignment with the pass axis and the other arm 9 or 9' is upwardly offset to lie above the top of the casing. A central adjusting device is arranged between the upper arms 9 and 9' of the two holders and enables a joint and horizontal adjustment of the distance between these two arms and between the rollers, which adjustment is symmetrical with respect to the pass axis. The adjusting device consists of an adjusting member 11, which has the shape of a double wedge in the top plan view (Fig. 1) and is adjustable in its longitudinal direction by means of a threaded bolt 10. Each of the lateral wedge faces of this adjusting member acts on an engaging member 12 or 12', which is displaceable transversely to the direction of movement of the material to be rolled. A tension spring 13 urges the arms 9 and 9' of the two holders against these engaging members. To this end each holder has inserted therein an engaging pin 14 or 14', which has a crowned engaging surface which engages a plunger 16'
inserted in the engaging member 12 or 12' with a dish spring 15' interposed. The plunger 16' is held by an adjusting nut 17', which is inserted in the engaging member and enables an adjustment of the initial stress of the dish spring 15'. The longitudinal adjustment of the pin 10 will cause a longitudinal displacement of the wedge body 11, whereby the distance between the engaging members 12, 12' and of the holder arms 9, 9' and finally of the rollers 8, 8' is parallel to the direction of movement of the material to be rolled. The initial stress against which the two rollers increase their distance is determined by the two dish springs.

The guide rollers 8 are rotatably mounted in the roller holders 1 on shafts 23 as closely as possible to the roll gap. The shaft 23 has shrunk thereon an inner race, which consists of the parts 24 and 25 and on which the rolling elements 27 roll in guide surfaces 26. The guide roller 8 forms the outer race of the anti-friction bearing and is provided on its inside with bearing surfaces 29, in which the rolling elements 27 roll.

The construction shown in Fig. 5 differs from the construction described hereforemost only in that the double wedge-shaped adjusting member 10, 11 is replaced by an adjusting device which consists essentially of an annular nut 18, which has right-hand and left-hand screw threads and is screwed on engaging members 19, 19' which correspond to the engaging members 12, 12' and are provided with corresponding screw threads. The distance between the engaging members 19, 19' can be uniformly varied by turning the adjusting nut 18. In other respects this embodiment corresponds substantially to the construction shown in Figs. 1 to 4.

The construction provided by the invention distinguishes mainly by the fact that both rollers can automatically and evenly be adjusted by a common central adjusting device and that the roller holders can be installed and removed independently of the guide jaws and without need for a readjustment after the replacement. The design, of course, may advantageously be applied not only to horizontal frames, but to vertical frames as well.

What is claimed is:
1. A roller guide for rolling mills, which comprises two pivot pins arranged symmetrically with respect to the pass axis, two rigid levers each of which is pivoted mounted on one of said pivot pins, two guide rollers each of which is carried by one of said levers, a common adjusting device simultaneously operatively connected to both of said levers and operable to cause a joint symmetrical movement of said rollers in the same sense relative to the pass axis, said adjusting device comprising two engaging members and an adjusting member operatively connected to said engaging members each of which acts upon one of said levers, spring means arranged between said levers to urge them against said engaging members, further spring means arranged between each of said levers and each of said engaging members to urge said rollers against opposite sides of the material to be rolled.
2. A roller guide as set forth in claim 1, in which the adjusting device comprises an adjusting nut having right-hand and left-hand screw threads and two engaging members which are arranged to be displaceable transversely to the direction of movement of the material to be rolled and provided with corresponding screw threads in threaded engagement with said nut for joint symmetrical adjustment thereby.
3. A roller guide as set forth in claim 1 in which the adjusting device comprises an adjusting member which is displaceable in its longitudinal direction and acts upon two engaging members which are oppositely displaceable transversely to the pass axis.
4. A roller guide as set forth in claim 1 which also comprises a casing and in which each of said levers has one arm which carries one of said rollers and another arm acted upon by said adjusting device and offset from said arm to be disposed above the top of said casing.
5. A roller guide as set forth in claim 4 in which each of the pivot pins of at one of the ends thereof are formed with threads in threaded engagement with a bore of the associated lever, said ends of the pivot pins engaged with centers which are screwed into the yoke body of the casing, each of said pivot pins including a knob for turning said pin.
6. A roller guide as set forth in claim 1 also comprising plungers inserted in each of the engaging members and abutting the lever associated thereto, spring means interposed between each plunger and its associated engaging member.
7. A roller guide as set forth in claim 6 in which the adjusting device comprises an annular nut provided with right-hand and left-hand screw threads engaging each one of the engaging members which are provided with corresponding screw threads to vary the distance between said engaging member by turning said adjusting nut.
8. A roller guide as set forth in claim 6 in which each of the levers is provided with an engaging pin abutting upon the plunger of its associated engaging member.

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