



July 4, 1967

C. ROY ET AL  
ROLLING MILL GUIDES

3,328,993

Filed Oct. 29, 1964

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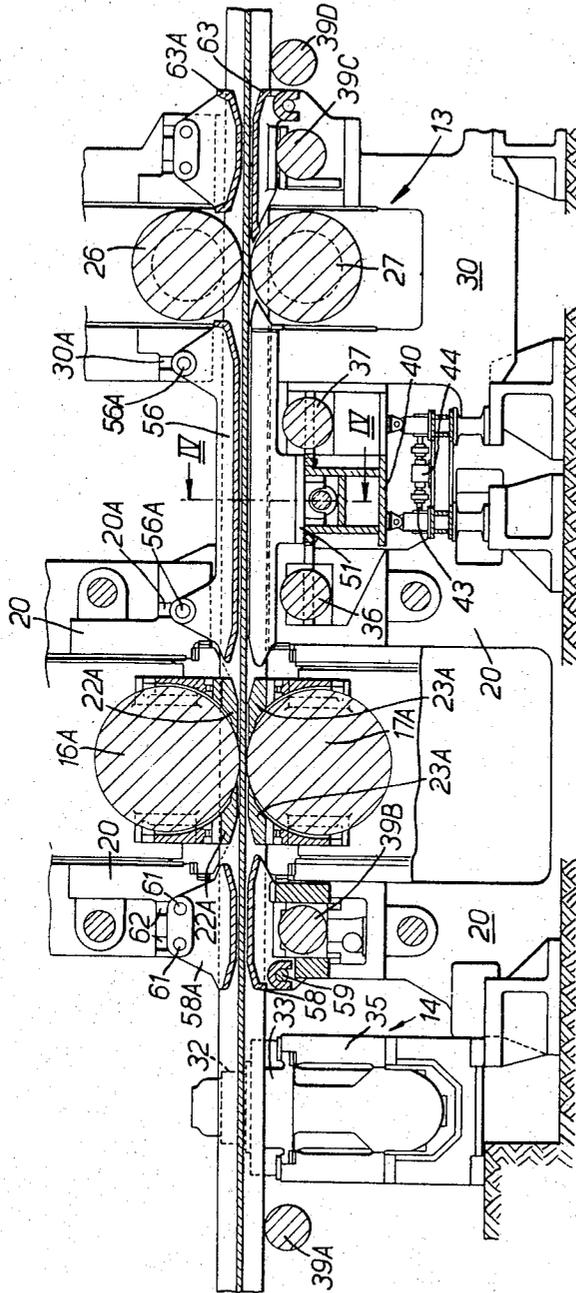


FIG. 2.

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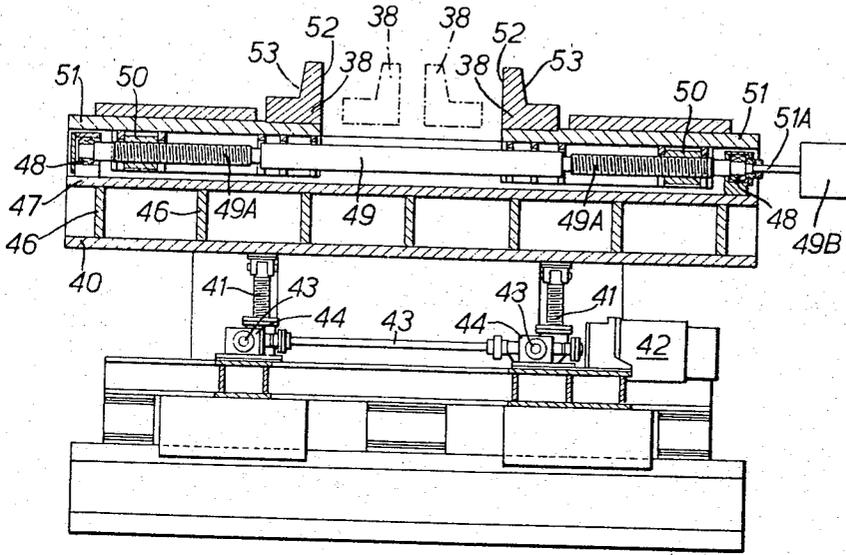


FIG. 3.

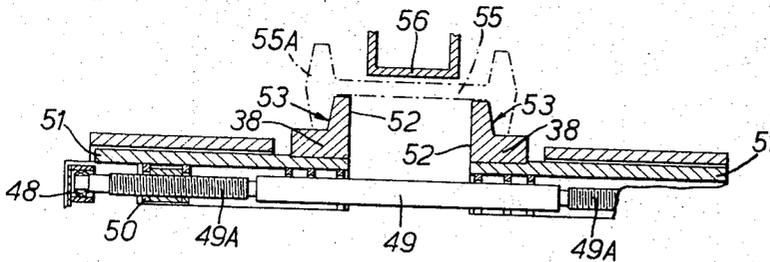


FIG. 4.

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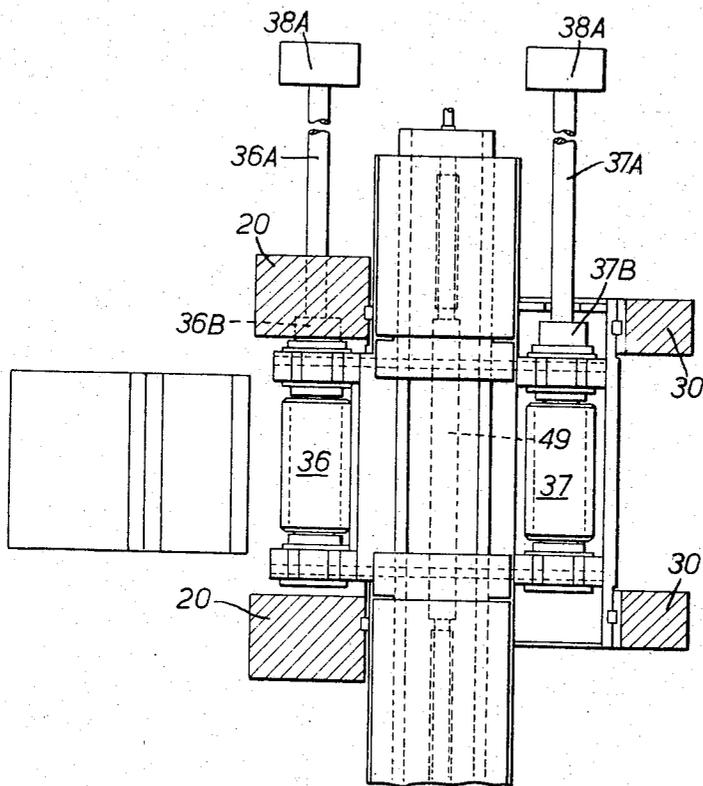


FIG. 5.

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3,328,993

**ROLLING MILL GUIDES**

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Filed Oct. 29, 1964, Ser. No. 407,456

Claims priority, application Great Britain, Oct. 29, 1963, 42,576/63

8 Claims. (Cl. 72—250)

This invention relates to rolling mill guides and is particularly concerned with guides for guiding the product from a rolling mill stand designed to produce more than one type of product, with differing widths and thicknesses. The invention is primarily directed to, but not limited to, guides for a rolling mill designed to roll either beam or plate, the plate usually being thicker than the web of the beam and being wider than the beam.

Because of the high rate of output of a beam mill, such a mill may periodically be left idle. To make use of the idle period it is an advantage that the beam mill should be designed also to roll plate, so that the mill may be used for a higher proportion of its useful life. However, if the mill is to change over from rolling beam to rolling plate, and vice versa, reasonably frequently, the changes that must be made to the mill and to the auxiliary equipment should be capable of being effected quickly and easily.

In accordance with one aspect of the present invention, a rolling mill train for rolling different products having different dimensions normal to the direction of material flow includes a pair of guides spaced apart transversely of the direction of movement of the product and adjustable both in separation and in height so that the guides may accommodate products of differing widths and thicknesses. Thus, when the stand is designed to roll either beam or plate each guide preferably has a vertical surface, facing the other guide and adapted to guide one edge of the plate, and also has a surface inclined to the vertical and facing away from the other guide, for contacting the inner face of a flange of the beam. In this case, when changing over from rolling beam to rolling plate, the spacing of the two guides is increased from the width of the beam to the width of the plate, and the guides are also raised so as to engage the side edges of the plate.

The invention will be more readily understood by way of example, from the following description of guides for a universal beam mill connectable for use as a plate mill, reference being made to the accompanying drawings, in which:

FIGURE 1 is a fragmentary sectional side view of the mill as set up for the rolling of plate,

FIGURE 2 is a view similar to FIGURE 1, but showing the mill as set up for the rolling of beam sections,

FIGURE 3 is a section on the line III—III of FIGURE 1,

FIGURE 4 is a section on the line IV—IV of FIGURE 2, and

FIGURE 5 is a part-sectional plan view on the line V—V of FIGURE 1 with the guides removed.

Referring to FIGURE 1, the mill comprises a universal rolling stand 12, a beam edging stand 13, and a plate edging stand 14.

The universal rolling stand 12 includes horizontal rolls 16, 17 mounted for rotation in chocks 18, 19 respectively, the chocks 18, 19 being mounted in housing members 20. Mounted adjacent the roll 16 are stripper and guide members 22, and adjacent the roll 17, stripper and guide members 23, these being provided to properly direct the beam into the roll pass, or to strip it from the rolls if it should adhere thereto.

The beam edging stand 13 is provided with horizontal rolls 26, 27 mounted for rotation in chocks 28, 29 respectively, the chocks 28, 29 being located in housing members 30.

The plate edging stand 14 includes vertical rolls, one of which is indicated at 32, mounted for rotation in chocks 33 located in housing members 35. Secured to the chocks 33 is a pair of guide members, one of which is indicated at 34, these guide members being provided to prevent the plate moving upwardly when passing between the rolls 32.

Between the universal rolling stand 12 and the beam edging stand 13, there is a pair of breast rollers 36, 37 and a pair of guides 38 which extend parallel to one another in the direction of movement of the product through the mill and which are spaced apart at right angles to that direction. In addition, breast rollers 39A, 39B, 39C and 39D are provided, the breast roller 39B being located on the left-hand side of the housings of the universal stand 12, and the breast roller 39C being located on the right-hand side of the housing of the beam edging stand 13.

The guides 38 and breast rollers 36, 37 are carried on a platform 40, which is supported on four screw-jacks 41 driven by a motor 42 (FIGURE 3) and coupled together by shafts 43 and gear boxes 44. The platform 40 supports, through upright members 46, a plate 47 on which are mounted bearings 48 for a shaft 49, having at each end a threaded portion 49A. The threaded ends 49A of the shaft 49 each mesh with a nut 50, the nuts 50 being secured to plates 51 carrying the guides 38.

By operation of a motor 49B driving the shaft 49 through a spindle 51A, the separation of the guides 38 may be adjusted, the positions of the guides 38 for wide plate being shown in full line, whilst the positions for narrow plate are indicated in chain line.

Each guide 38 has a universal surface 52 facing the other guide, and a surface 53 inclined slightly to the vertical on the side facing away from the other guides. The vertical surfaces 52 are intended to contact and guide the plate, whilst the inclined surfaces 53 will serve to contact and guide the beam 55 having flange 55A.

The breast rollers 36 and 37 shown in plan in FIGURE 5) carried by the platform 40 are driven, via spindles 36A, 37A respectively, by motors 38A. The spindles 36A and 37A are connected to their motors by detachable couplings 36B and 37B and the spindle 36A passes through a slot in the housing post 20.

When converting the mill from the rolling of plate to the rolling of beam sections (FIGURE 2), the rolls 16, 17 of the universal stand are removed together with the guides 22, 33, rolls 16A, 17A and new guides 22A and 23A inserted, and vertical rolls, as described in our co-pending application No. 347,291, are brought into operation. The shafts 36A and 37A are disconnected at their couplings 36B and 37B and the screw-jacks 41 are operated to lower the platform 40 so that the breast rollers 36 and 37 will be removed from the path of the lower flanges of the beam to be rolled. At the same time, the breast rollers 39 are also lowered. An upper guide member 56 is located above the guide 38 by being suspended by pins 56A engaging a slot 20A in the right-hand post of the housing 20 and a slot 30A in the left-hand post of the housing 30 of the beam edging stand 13.

A guide member 58 is inserted such that it is supported above the breast rollers 39B by means of a pin 59 engaging a slot 60, and a guide member 58A is suspended by pins 61 engaging slots 62 in the left-hand post of the housing 20. Similarly upper and lower guide members 63 and 63A are inserted above the breast roller 39C.

The rolls 32 and guides 34 of the plate edging stand 14 are then moved away from each other and suitable guides (not shown) are fitted to guide the beam at this

point. The shaft 49 is then operated to bring the guides 38 to the position shown in FIGURE 4, where they are located at the level at which the web of the beam 55 is to be delivered by the universal stand 12. The guides 38 are then in position to guide the beam 55 from the universal stand 12 to the beam edging stand 13, whose rolls have been moved to a position ready for edging the beam.

In accordance with the provisions of the patent statutes, we have explained the principle and operation of our invention and have illustrated and described what we consider to represent the best embodiment thereof. However, we desire to have it understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

We claim:

1. A rolling mill train including a combination rolling mill stand alternatively operable as a universal beam mill or a plate mill, and a pair of guides spaced apart transversely of the direction of movement of the material being rolled to guide the material as it enters or leaves the stand, each guide having a vertical surface facing the other guide and adapted to guide one edge of a plate, and a further surface inclined to the vertical and facing away from the other guide for contacting the inner face of a flange of a beam, the pair of guides being adjustable in separation and height.

2. A rolling mill train as claimed in claim 1, and including a beam flange edging mill to which the guides direct the material.

3. A rolling mill train as claimed in claim 1, in which

the guides are supported on a platform which is adjustable in height.

4. A rolling mill train as claimed in claim 3 in which the guides are adjustable in separation upon the platform.

5. A rolling mill train as claimed in claim 3, in which the platform supporting the guides also supports breast rollers for supporting the material being rolled when the mill train is being used for rolling plate.

6. A rolling mill train as claimed in claim 1, in which the guide carrying members are adjustable both in height and separation by means of screw-threaded shafts rotatable by electric motors.

7. A rolling mill train as claimed in claim 2, the rolling mill train including a plate edging mill on the side of the combination mill remote from the beam flange edging mill, and adapted to support guides for guiding the material when rolling beams.

8. A rolling mill train as claimed in claim 1, in which the said combination mill includes a breast roller supported on the side of the mill stand remote from the beam flange edging mill, the breast roller being adjustable in height and its supporting structure being adapted to support beam guide means when the said breast roller is lowered.

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