PATENT SPECIFICATION

622,643

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COMPLETE SPECIFICATION

Improvements in Rolling Mills.

We, AKTIEBOLAGET SVENSKA KULLAGERFABRIKEN, a Corporation organized under the laws of the Kingdom of Sweden, of 17, Artillerigatan, Goteborg, Sweden, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in rolling mills and has for one object to facilitate the changing of the rolls in rolling mills and thereby to increase the capacity of the mill. Another object of the invention is to cheapen the design of rolling mills by dispensing with the expensive and bulky stands. Yet another object of the invention is to decrease the give or yield in the mill and thereby to permit rolling to closer tolerances.

Accordingly, the invention provides a rolling mill which is characterised by the fact that the bearing housings for the roll bearings are connected by pre-loaded bolts for taking the roll pressure, by means of which the housings are brought into engagement with each other, or with one or more rigid members interposed between the housings, and that at least one of the rolls is provided with means interposed between the roll neck and housing for positively adjusting the roll radially relative to its bearing housing or housings.

One form of a rolling mill according to the invention is shown in the accompanying drawings in which Fig. 1 is a side view of the mill and Fig. 2 is a front view of one side of the mill.

The necks 3 and 4 of the rolls 1 and 2 are carried in roller bearings 5 and 6, mounted in housings 7 and 8 respectively. Instead of being mounted as is usual in stands, the housings 8 are bolted directly to a machine bed. The housing 7 is bolted to the housing 8 by means of a pair of strongbolts 9 screwed into holes 10 in the housing 8, the bolts 9 passing freely through bores 11 in the housing 7. The housings are held together by nuts 12. The usual stands can therefore be dispensed with.

The distance between the rolls is adjusted approximately by spacers 33 and shims 34 through which the bolts 9 pass. The nuts are tightened until a considerable preloading is imposed on the bolts 9, the spacers 33 and the housings 7 and 8. The parts of the housings surrounding the bolts, which are subjected to preloading have a considerably greater cross-sectional area than the bolts themselves. By bolting the housings together with a total force in excess of the roll pressure the "give" in the mill when rolling is considerably decreased. The rollers therefore maintain their relative positions and it is possible to roll to closer tolerances.

To permit fine adjustments to be made the bearing 5 at each end of the roll 1 is mounted in a sleeve 13 the inner and outer cylindrical surfaces of which are eccentric to each other. The sleeve 13 can be rotated in the housing 7 and is retained in axial position by a split ring 14, which engages a groove 15 in the sleeve. The sleeve 15 is provided with a projection 16 to which a socketed lever can be applied, and by means of which the sleeve can be rotated in the housing. The eccentricity of the sleeve is about 0.5 to 2mm. and the position of the roll can therefore be adjusted about $\pm.35$ to ±1.5 mm. for a quarter turn of the sleeve 13. This is sufficient to cover the spacings which may be conveniently obtained by the use of shims together with the spacers. By these means it is possible to adjust the distance between the rolls 1 and 2 very accurately.

When rolling wire it is essential that the groves in the rolls register accurately and it is therefore necessary to make provision for adjusting the rolls axially relative to each other. In the embodiment of the invention illustrated, this adjustment is effected by shifting the roll 2 relative to the roll 1, for which purpose the bearing 6 is slidable relative to the housing 8. Between the bearing 6 and the housing 8 is a sleeve 17, the inner and outer cylindrical surfaces of which are concentric. The sleeve 17 is threaded at its outer end as shown at 18. These threads engage with

threads on a ring 20 fixed to the housing 8 by means of screws 19. The bearing is held between a shoulder 25 on the sleeve 17 and a sealing ring 26 screwed into the sleeve 17. The bearing 6 is consequently held in a fixed position relative to the sleeve.

A ring 21 is provided for turning the sleeve 17. The ring 21 has tongues 22, which engage with a groove 23 in the sleeve 17 and also has a projection 24 to which a socketed lever may be applied to turn the ring 21, whereby the sleeve 17 is also turned. As the sleeve 17 is turned it is shifted axially due to its threaded engagement with the ring 20 in the manner of a screw in a nut.

The bearing 6 takes part in the axial movement and the roll 2 will be shifted in a direction depending upon the direction in which the ring 21 is turned. The amount of this movement is conveniently about 1 mm., but may be more or less depending upon the special conditions in each case.

To change rolls it is only necessary to loosen the housings from the bed and replace them with a pair of rolls, the housings of which have already been screwed together with spacers 13 of the desired size, after which the more accurate adjustments can be made by means of the sleeves 13 and 17. The main adjustments have therefore already been made in advance and the fine adjustments required after the housings have been put in place can be carried out very easily and quickly.

The device described above is primarily intended for use with wire rod mills and fine jobbing mills but its field of use is not limited hereto. The design may be modified without departing from the invention. Devices for radial adjustment may be applied at both ends of the roll or rolls whereby it will be possible to adjust the rolls for parallelism. All bearings of a roll may be mounted in the same sleeve. Thus the bearings may all be at the same end of the roll, as in a rolling mill with overhanging rolls; or the bearings may be mounted in a sleeve which extends from one end of the roll to the other and has an opening to enable the roll to engage the work.

The outer race ring of the bearing may be made eccentric, in which case the eccentric sleeve may be dispensed with. The spacers may be made wedge-shaped, whereby it is possible to make a rough adjustment or readjustment without dismantling the mill.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A rolling mill characterised in that the bearing housings for the roll bearings are connected by pre-loaded bolts for taking the roll pressure, by means of which the housings are brought into engagement with each other, or with one or more rigid members interposed between the housings, and that at least one of the rolls is provided with means interposed between the roll neck and housing for positively adjusting the roll radially relative to its bearing housing or housings.

2. A rolling mill according to Claim 1, characterised in that the parts of the housings surrounding the pre-loaded bolts have greater cross-sectional area than the bolts.

3. A rolling mill according to Claim 1 or Claim 2 characterised in that the bearings of at least one of the rolls are mounted in eccentric sleeves rotatable relative to the housings.

4. A rolling mill according to Claim 1 or Claim 2, characterised in that the outer race rings, or the bearing brasses of the bearings of at least one of the rolls are eccentric.

5. A rolling mill according to any of Claims 1 to 4, characterised in that the bearings of at least one of the rolls are mounted in sleeves axially slidable in the housings.

6. A rolling mill according to any of Claims 1 to 4, characterised in that the bearings of at least one of the rolls are axially slidable directly in the bearing housings.

7. A rolling mill substantially as hereinbefore described with reference to the accompanying drawings.

Dated this 4th day of February, 1946.

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4. A rolling mill according to Claim 1 or Claim 2, characterised in that the outer race rings, or the bearing brasses of the bearings of at least one of the rolls are eccentric.

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