Aug. 23, 1932. J. W. KENT 1,872,967

ADJUSTING DEVICE FOR ROLLER MILLS

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Fig. 1

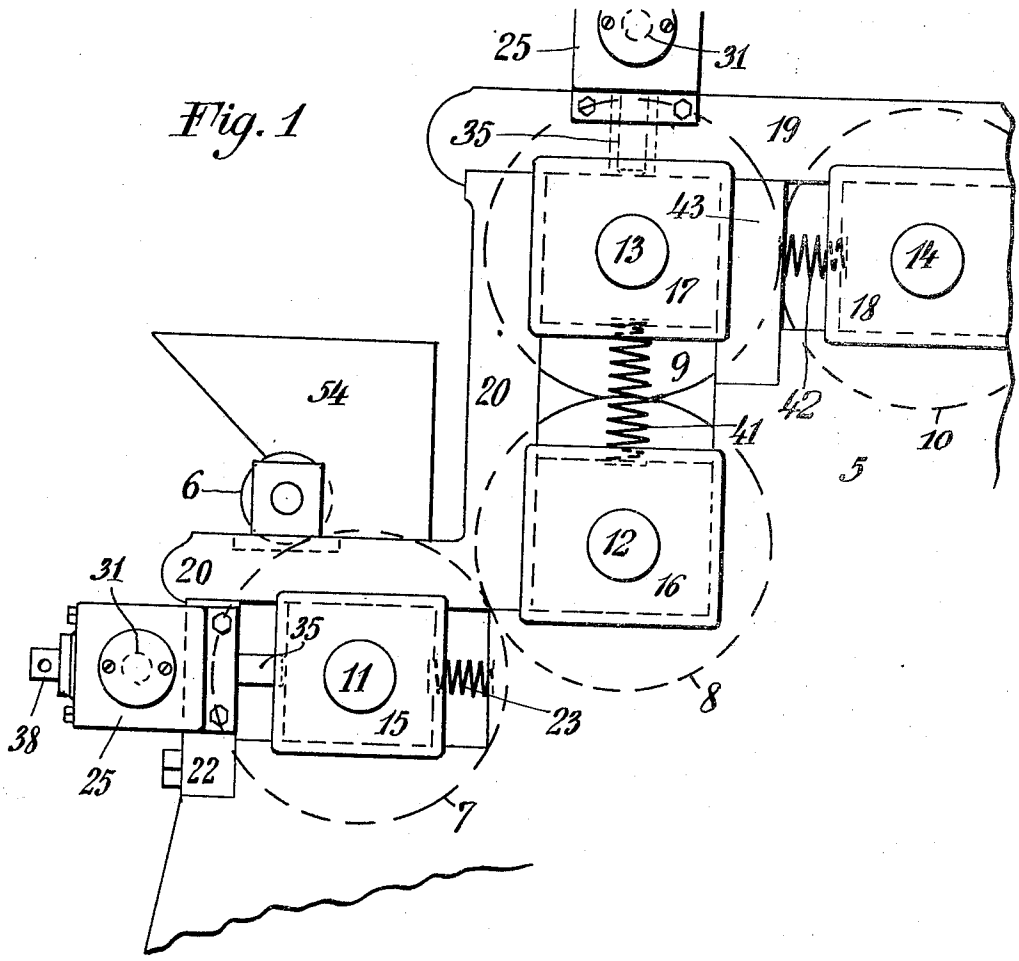
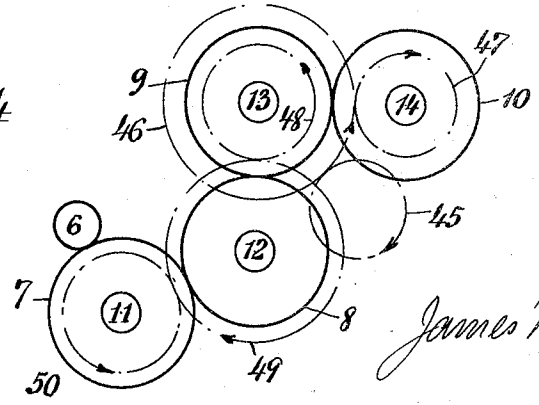


Fig. 4



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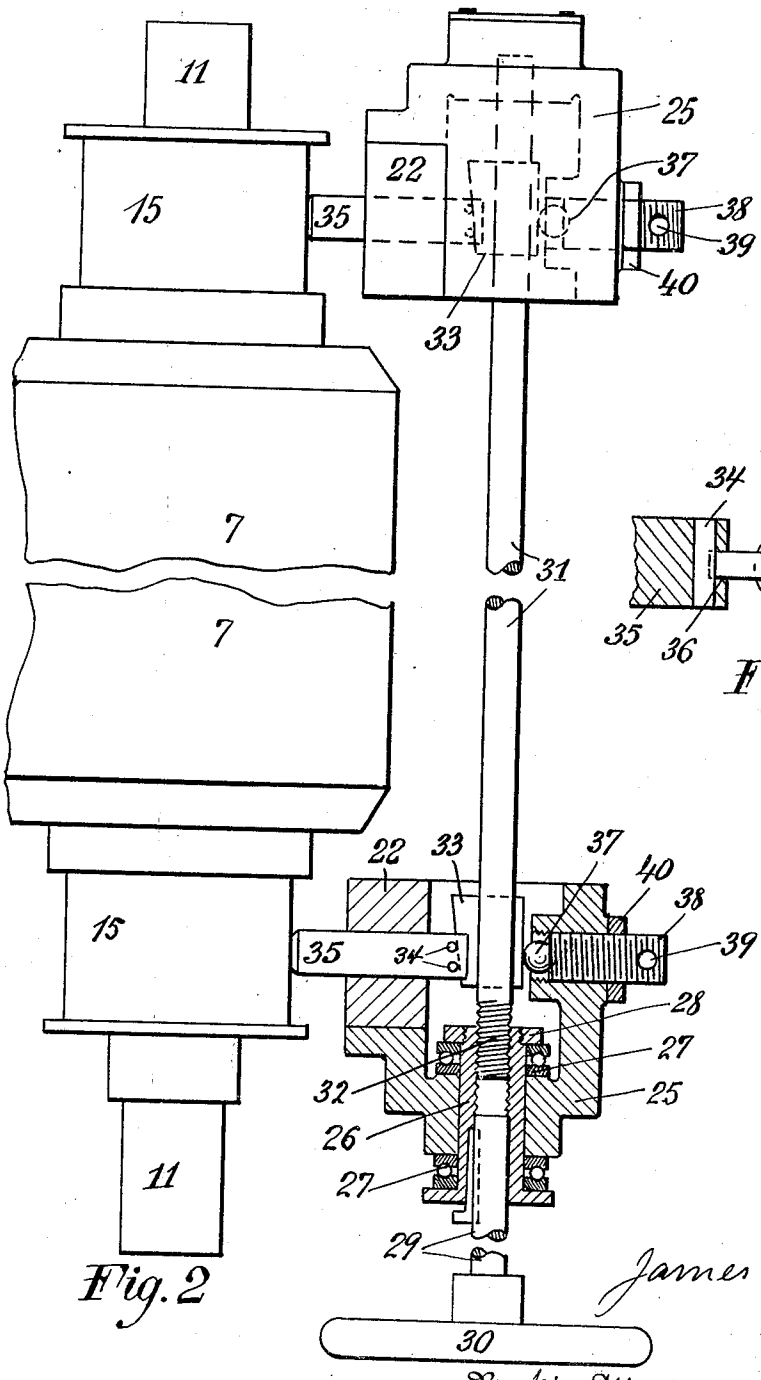


Fig. 2

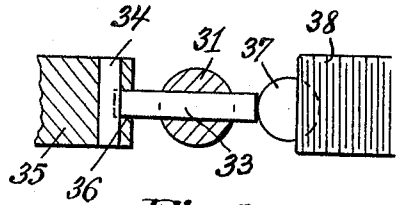


Fig. 3

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UNITED STATES PATENT OFFICE

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ADJUSTING DEVICE FOR ROLLER MILLS

Application filed February 19, 1930. Serial No. 429,501.

This invention relates to improvements in the adjusting mechanism employed in roller mills of the type used for grinding paints and like materials. The invention also relates to certain novel arrangements in the operation of such a mill for the purpose of increasing the output.

The object of the invention is to provide an improved roller adjusting mechanism in mills of the type shown in my pending application for patent filed May 9th, 1929, Serial Number 361,636, although the present invention is not limited to any particular type of mill.

In machines of the type referred to, the material, such as paint, is ground by being passed between adjacent rollers, which must be finely adjusted towards each other so that the material passes between them in the shape of a thin film of varying thicknesses depending upon the material and the degree of grinding desired. And in order to insure uniformity it is necessary that the adjusting mechanism be of a type which does not admit of accidental disturbance, free play or other troublesome influences.

Heretofore the adjusting mechanisms for accurately positioning the grinding rollers have usually included a number of gears and pinions, which admit of a certain amount of play between co-operating parts and this in turn has caused trouble and inaccuracies in the adjusted relations of the grinding rollers. With such geared mechanisms it has been a practical impossibility or nearly so to obtain permanency in the adjusted positions of the rollers.

It is a specific object of this invention to provide grinding roller adjusting means so arranged and constructed, that adjustments to a very fine degree may be easily obtained and maintained throughout the grinding operation without requiring constant attendance and frequent re-adjustments.

With these objects in view my invention is embodied in an adjusting mechanism for roller mills and in certain other features thereof as hereinafter described and as illustrated in the accompanying drawings in which

Fig. 1 is a side view in outline of a roller mill equipped with my improved adjusting mechanism, parts being broken away and with details omitted.

Fig. 2 is a plan view, partly in section and partly broken away, showing the adjusting mechanism in detail.

Fig. 3 is a detail view of parts shown in Figure 2.

Fig. 4 is a diagrammatic view illustrating an improved driving mechanism for the grinding rollers.

The reference numeral 5 denotes a hollow housing or frame work in which there is mounted a plurality of grinding rollers 6, 7, 8, 9 and 10. The roller 6 is also a feed roller which, together with a portion of the roller 7, forms the bottom of the hopper 54 which contains the material to be ground. The grinding rollers are provided with shafts 11, 12, 13 and 14 which are journaled in bearing boxes 15, 16, 17 and 18, the construction of course being duplicated on the other side of the machine.

The bearing boxes are secured in place by suitable top bars 19 and front bars 20. The rollers are kept in frictional grinding contact with each other and are adjusted so as to regulate the pressure between them. The adjustment is, however, regulated with reference to the third roller 8, the bearings 16 of which are clamped in position by the front bars 20.

The second roller 7 is adjusted with reference to the roller 8 by means which operate through spacing blocks 22 which are clamped securely in place between the bars 20 and the frame and bolted to the latter leaving room for the bearing 15 to slide in. Springs 23 are interposed between the bearings and the frame.

The adjusting mechanism comprises the following elements. To each spacing block 22, see Figure 2, there is bolted a housing 25, one of which forms a bearing for a rotatably mounted interiorly threaded sleeve 26, which is supported between suitable thrust ball bearings 27, 27 and locked against axial movement by a nut 28. The sleeve is rotated by a shaft 29 which is keyed to it and provided with a hand wheel 30.

The numeral 31 denotes an adjusting shaft which extends from housing to housing, and which is in threaded engagement with the sleeve 26 at 32. Within each housing the adjusting shaft 31 carries a wedge 33 adapted to slide transversely of the shaft in a slot therein. One side of the wedge is tapered and bears against hardened steel pins 34 fitted into the end of a sliding adjuster bar 35.

As shown in Figure 3, the end of the bar 35 is slotted at 36 to receive the wedge and the pins 34 project into the slot. The other side of the wedge is preferably straight and against it bears a steel ball 37 seated within a screw 38 in threaded engagement with the housing. The screw has a hole 39 for the application of a turning tool, such as a bar or pin. 40 is a lock nut. The adjuster bar 35 is slidably held in the spacing block 22 and bears against the journal box 15.

The construction is alike at both ends of the shaft 31 except that the operating or actuating sleeve 26 is found at one end only.

The roller 7 is adjusted by operating the handwheel 30 to rotate the threaded sleeve 26 whereby to cause an axial movement of the adjusting shaft 31 to draw the wedges longitudinally against the pins 34 and force the bars 35 against the bearing boxes 15 to move the roller 7 towards the roller 8 against the force of the springs 23 to obtain the required frictional grinding contact between the two rollers.

When this has been accomplished, one or both of the screws 38 may be operated to force the ball 37 against the wedge 33 and either finely adjust the pressure at either or both ends of the roller 7, or to lock the wedge firmly in adjusted position. In any event, it will be seen that once adjustment has been made there is no play between the parts of the adjusting mechanism which remains set until changed by the operator. The wedge 33 is the only member which has an adjusting pressing movement, and inasmuch as it operates between the hardened steel parts 34 and 37, the wear and tear is negligible, positive operative action assured and the adjustment is permanent for the particular setting.

A similar adjusting mechanism is shown at the top of Figure 1 for adjusting the roller 9 against the force of the spring 41. A still further similar adjusting mechanism is employed for adjusting the roll 10 against the force of the spring 42 which is seated against a block 43 locked in the frame. The last mentioned adjusting mechanism is not shown.

In roller mills of the type herein disclosed it has been the practice to gradually increase the speed of the rollers progressively from the roller 7 to the roller 10. I have found, however, that a finer grinding may be done and the output materially increased by slowing up the roller 9. This result may be caused by an increase or accumulation of material between the rollers 8 and 9 whereby an increase in the grinding pressure might result. In any event, the slowing up of the roller 9 results in increased output.

Figure 4 illustrates diagrammatically a driving mechanism which operates to slow down the roller 9. In this instance a driving gear 45 operates at 300 R. P. M. and drives the gear 46 on roller 9 at 150 R. P. M. The gear 46 drives the gear 47 on roller 10 at 300 R. P. M.

The gear 48 which also runs at 150 R. P. M. drives a gear 49 on the roller 8 at 225 R. P. M. and gear 49 drives gear 50 on roller 7 at 75 R. P. M. The speed of the rollers is therefore increasing except at roller 9 which is materially slower than the preceding and succeeding rollers 8 and 10 respectively.

I claim:

1. In a roller mill of the character described, a grinding roller, a pair of bearing boxes supporting the same, a plurality of non-rotatable members operable laterally in contact with the said bearing boxes to adjust the same, means for simultaneously actuating said non-rotatable members and other means for individually actuating said non-rotatable members to effect an individual adjustment of the bearing boxes and lock the same in adjusted positions.

2. In a roller mill of the character described, a grinding roller, a pair of bearing boxes supporting the same, adjuster bars laterally operable in contact with the bearing boxes to adjust the position of the said roller, means for simultaneously actuating said adjuster bars and other means for individually actuating the adjuster bars to effect individual adjustments of the bearing boxes and for locking them in adjusted positions.

3. In a roller mill of the character described, a grinding roller, a pair of bearing boxes supporting the same, adjusting means for said bearing boxes comprising adjuster bars contacting with said boxes, wedges for actuating said adjuster bars, an adjuster shaft for slidably supporting said wedges, means for operating the adjuster shaft to cause the wedges to force the adjuster bars against the bearing boxes, and other means for moving the wedges transversely of the said adjuster shaft to lock the adjuster bars in adjusted positions.

JAMES W. KENT.