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SAFETY DEVICE FOR ROLLER MILLS

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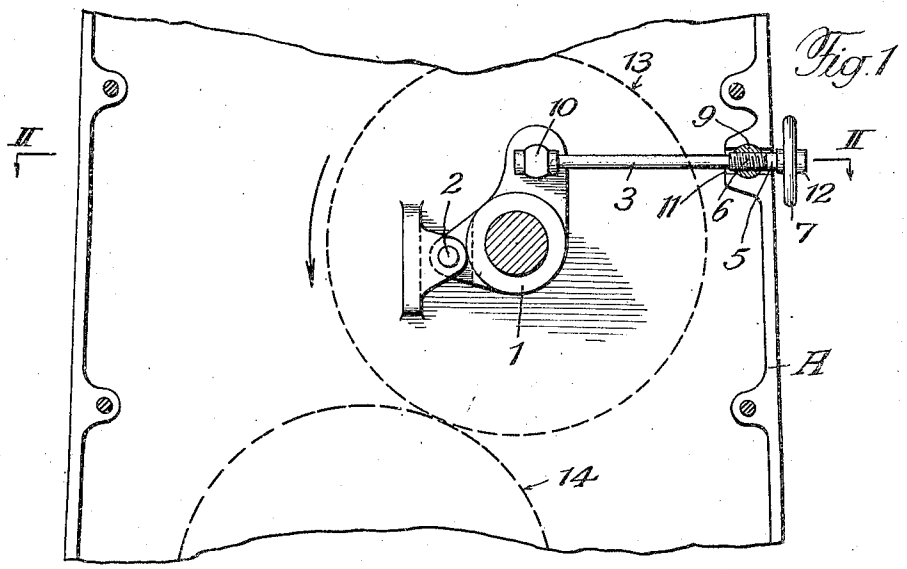


Fig. 1

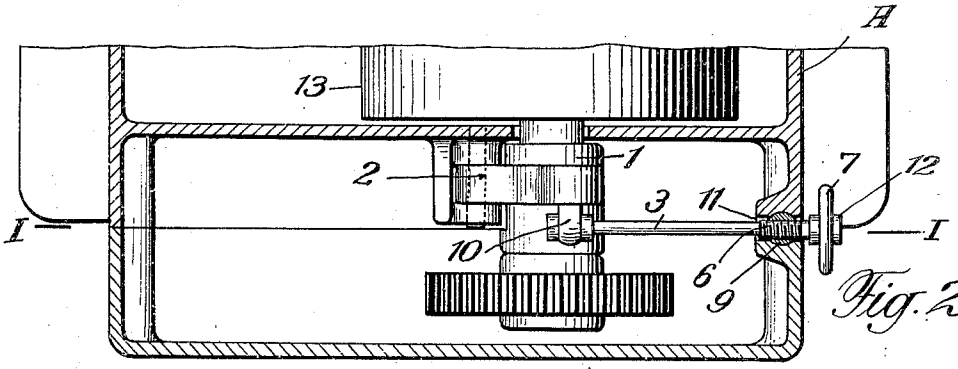


Fig. 2

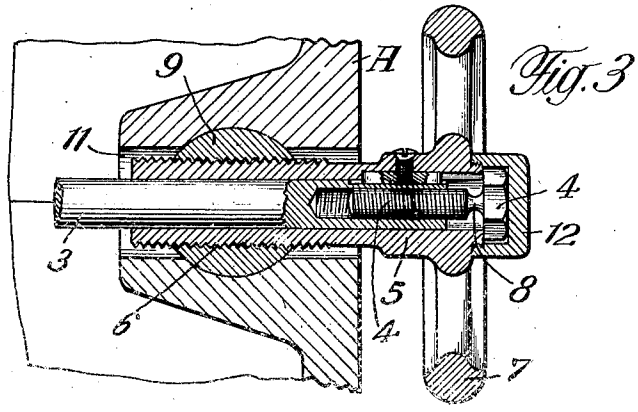


Fig. 3

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SAFETY DEVICE FOR ROLLER MILLS

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2 Claims. (Cl. 83—12)

This invention relates to safety devices for roller mills.

In the paint and chocolate industries, roller mills are used in which chocolate and color pastes are finely ground. To this end, the material to be worked is passed between rollers that are firmly pressed against one another. During the grinding operation it may happen that a relatively large piece of foreign matter enters the gap between cooperating rollers so as to be jammed therebetween. In consequence thereof, the rollers, particularly the axle pins of the same and the correlated bearings, are heavily strained, thus inviting damage. In order to protect the machine against damage, when subjected to such heavy straining, it is known, to apply safety elements such as may be termed disruptive bolts.

According to the present invention an improved safety device against damaging of the mill, due to the grinding pressure exceeding a predetermined value, is provided which comprises a bolt-like disruptive element anchoring a tensioning rod for adjusting the grinding pressure to an abutment of the mill frame, the element being removably connected to said rod and having a neck portion of a smaller cross section than that of its portion connecting with the rod which neck portion is disposed between said connecting portion and a head on the element by means of which the latter is anchored to said abutment, so as to fail incidental to excessive grinding pressure arising.

This arrangement permits of providing a compact rigid construction for the disruptive element and of transmitting the tension developing in the tensioning rod during the operation of the mill to the element free from secondary strains. In this way is ensured that the disruptive element breaks with certainty only when the grinding pressure exceeds a predetermined value, in distinction from safety devices in which the disruptive element is subjected to secondary straining in addition to the direct tensile strain accruing from the grinding pressure.

In the accompanying drawing the invention is illustrated as applied by way of example to a roller mill only the parts of which necessary for a proper understanding of the invention are shown. In this drawing

Fig. 1 shows a fragmentary sectional end elevation of the roller mill on the line I—I in Fig. 2, with the drive box cover removed;

Fig. 2 shows a sectional plan view of Fig. 1 on the line II—II in the latter, and

Fig. 3 is a sectional view of a detail of Fig. 1 on a larger scale.

In the drawing, numeral 1 designates one of the bearings of a grinding roller 13 of the mill to be protected by the safety device and numeral 2 designates a pivot by means of which this bearing is rockably arranged on the frame A of the mill. The tensioning rod 3 of the grinding pressure adjusting arrangement of the mill is anchored to the mill frame A by means of a disruptive bolt 4 which is screwed in the outer end of said rod and the other end of the rod is rotatably connected to a lug 10 on a projection of the pivotal bearing 1. The tensioning rod 3 is mounted in a sleeve 5 which in turn is screwed in an interior screw thread 6 on a spherical mounting member 9 which connects with the mill frame A in the manner of a universal joint by engaging into mating depressions in a bore 11 of this frame. On the outer end of the sleeve 5, which is splined to the rod 3, a hand wheel 7 of suitable construction is arranged for controlling the axial displacements of the sleeve 5 in the screw thread 6, while the rod rotates together with the sleeve. A terminal cap 12 is screwed on this sleeve end, adjacent to the wheel for closing the sleeve and thereby holding the head of the disruptive bolt in position by the inside of the cap bearing against the outer end of the bolt. The underside of the bolt head abuts against a terminal shoulder on the sleeve 5, i. e., the outer sleeve end, in which way the anchorage of the tensioning rod 3 to the mill frame A is effected.

By turning the hand wheel 7, with the consequent displacements of the sleeve 5 relative to the member 9, the tensioning rod 3 shifts together with the sleeve. The shifting movements of the tensioning rod 3 have the effect of rocking the bearing 1 about the pivot 2 in one direction or the other in which way the pressure between the grinding rollers 13 and 14, which rotate as indicated by the arrow, is regulable, while the universal joint prevents secondary bending moments from arising in the tensioning rod 3 in any position of adjustment of the roller 13. By virtue of this construction of the safety device the bolt 4 also remains free from secondary strains.

When the pressure between the grinding rollers exceeds a predetermined value, the tension in the tensioning rod 3 surpasses a maximum allowable limit which corresponds to the limit of failure provided for the short neck portion 8 of the disruptive bolt 4. The smallest cross-section of this neck portion is so dimensioned

that due to the tensile stresses setting up at this cross section, by transmission of the maximum allowable tension in the rod **3** to the bolt, the shank and the head of the latter are torn apart.

Due to the fact that the cross section **8** is small as regards the other cross sections of the disruptive bolt **4**, the result obtains that at all strains below the limit of failure the bolt **4** is practically not deformed. If, however, the strain exceeds the critical limit the head of the disruptive bolt is torn off immediately.

Since the screw thread of the disruptive bolt is not overstrained, even when the head of the bolt is torn off, the thread is not injured. Due to this fact the bolt can be easily removed also in its disrupted condition from the tensioning rod **3**, after the cap **12** has been taken off, for example by gripping the projecting end portion of the bolt shank by means of a pair of pincers. A fresh disruptive bolt can then readily be inserted, whereupon the cap **12** is screwed in position on the sleeve **5** again.

I do not limit myself to the particular size, shape, number or arrangement of parts as shown and described, all of which may be varied without going beyond the scope of my invention as shown, described and claimed.

What I claim is:

1. In a safety device against damaging of roller mills, due to the grinding pressure exceeding a predetermined value, cooperating grinding rollers mounted in the mill frame, rockable bearing means for one of said grinding rollers, a mounting sleeve having a detachable bottom, an exterior thread on said sleeve for axially adjustably connecting the same with said frame, a hand wheel carried by said sleeve for controlling the axial adjustments of said sleeve relative to said frame, a tensioning rod for adjusting the grinding pressure splined with its outer end to said sleeve and rotatably connected at its inner end with said rockable bearing means, a bolt-like disruptive element removably connected to the outer end of said rod, a head on said element abutting with its underside on a terminal shoulder arranged on said sleeve remote from said bearing means and with its outer side on said detachable bottom of said sleeve, and a neck portion disposed between said head and the portion of said element connecting with said rod and having a cross section smaller than that of said connecting portion so as to fail by tension incidental to excessive grinding pressure setting up.

2. In a safety device against damaging of roller mills, due to the grinding pressure exceeding a predetermined value, cooperating grinding rollers mounted in the mill frame, rockable bearing means for one of said grinding rollers, a mounting sleeve, an exterior thread on said sleeve for axially adjustably connecting the same with said frame, a hand wheel carried on the end of said sleeve remote from said bearing means for controlling the axial adjustments of said sleeve in said thread, a terminal screw cap screwed exteriorly on said sleeve adjacent to said hand wheel, a tensioning rod for adjusting the grinding pressure splined with its outer end to said sleeve and rotatably connected at its inner end with said rockable bearing means, a bolt-like disruptive element removably connected to the outer end of said rod, a head on said element abutting with its underside on a terminal shoulder arranged on said sleeve remote from said bearing means and with its outer side on the inside of said unscrewable cap, and a neck portion disposed between said head and the portion of said element connecting with said rod and having a cross section smaller than that of said connecting portion so as to fail by tension incidental to excessive grinding pressure setting up.

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