United States Patent [19]

Blue

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[54] **ANTI-SKID ASSEMBLY FOR ROLLING MACHINES**

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[52] **U.S. Cl.** **72/88,** 72/469

[51] **Int. Cl.** **B21h 5/02**

[58] **Field of Search** 72/88, 90, 469

[56] **References Cited**

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[57] **ABSTRACT**

In a rolling machine of the type having toothed forming racks which are moved in opposite directions while being transversely engaged with a rotatably supported cylindrical workpiece, the workpiece is brought up to a desired rate of rotation prior to its engagement with the teeth on the racks by means of anti-skid pads of elastomeric materials which are arranged upon the respective leading ends of the racks for engagement with the workpiece.

6 Claims, 3 Drawing Figures

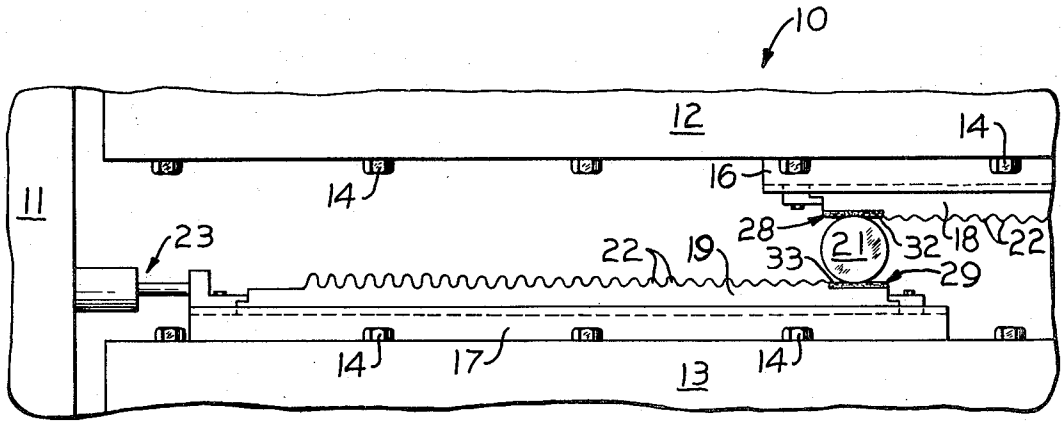


Fig. 1

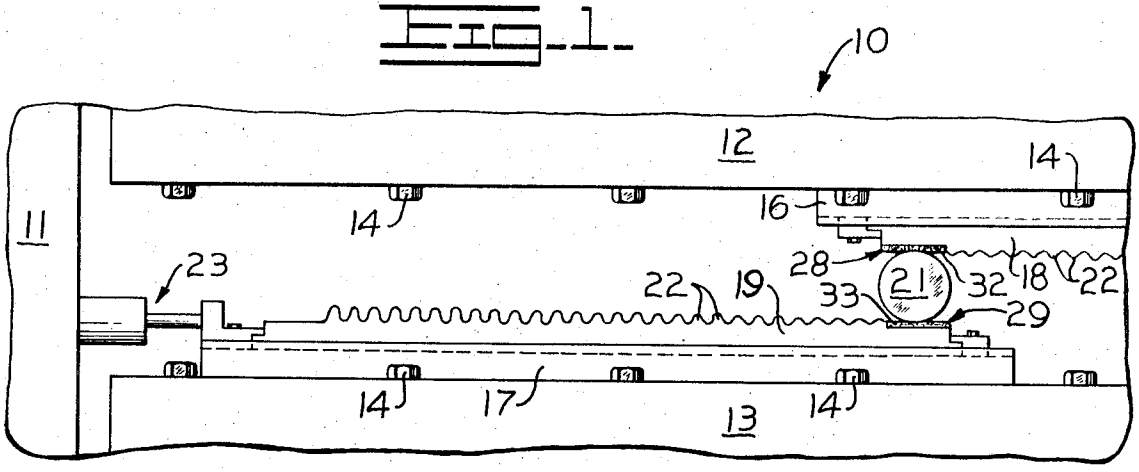


Fig. 2

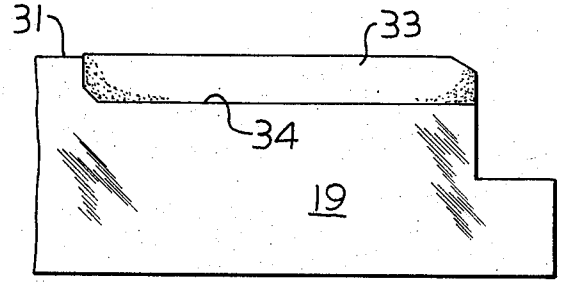
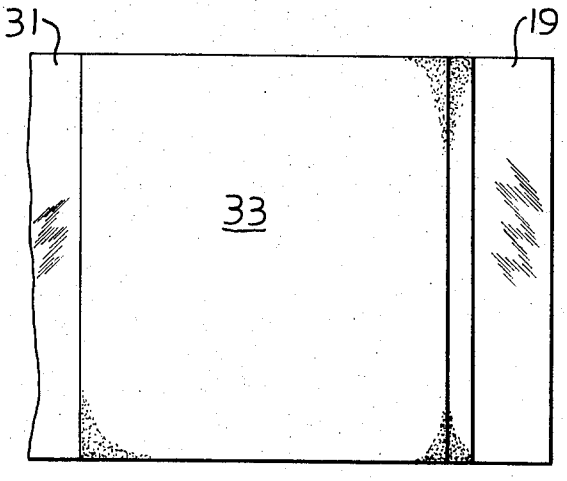


Fig. 3



ANTI-SKID ASSEMBLY FOR ROLLING MACHINES

BACKGROUND OF THE INVENTION

The present invention relates to rolling machines and more particularly to an anti-skid assembly which is adaptable to such machines for imparting rolling motion to the workpiece prior to its engagement with forming projections.

A rolling machine of the type particularly contemplated is described in greater detail within U.S. Pat. Application Ser. No. 296,280, filed Oct. 10, 1972 and assigned to the assignee of the present invention, said application having issued as U.S. Pat. No. 3818736.

The rolling machine of the above-noted patent is typical in that it includes a housing having upper and lower guide means for supporting a pair of powered slide members including forming racks which are tangentially engaged with a rotatably supported cylindrical workpiece. In order to properly impress a desired peripheral configuration upon the workpiece, it is desirable to initially set the workpiece in rotation at a selected speed commensurate with the lineal speed of the racks. This assures positive engagement of forming projections upon the racks with the workpiece in order to prevent undesired deformation or marring of the workpiece surface.

Rolling machines of the type disclosed above commonly have smooth surfaces formed at the leading ends of the racks which are intended to initially engage the workpiece and set it in rotation before it is contacted by the forming projections or teeth upon the racks. It has been found that such surfaces often are inadequate to bring the workpiece up to the desired rate of speed. The metal-to-metal contact between the workpiece and the smooth surfaces commonly permits the workpiece to "skid" rather than to commence desired rotation. This skidding tendency is further promoted by the presence of cutting oils upon the racks and the workpiece.

SUMMARY OF THE INVENTION

It has been discovered that problems of the type noted above may be overcome or eliminated through the employment of an anti-skid assembly comprising a pad of abrasive, oil-resistant and resilient material secured to a leading end of each forming rack, the anti-skid pads being configured for interference engagement with the workpiece in order to bring the workpiece up to a desired rate of rotation prior to its engagement with forming projections on the racks.

Additional objects and advantages of the invention are made apparent by the following description having reference to the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a fragmentary view in side elevation of a rolling machine of the type contemplated by the present invention.

FIG. **2** is a further enlarged fragmentary view illustrating a leading end of one of the forming racks on the rolling machine of FIG. **1** with an anti-skid pad being secured to the rack in accordance with the present invention.

FIG. **3** is another view of the leading end of the rack as seen from the top of FIG. **2.**

DESCRIPTION OF THE PREFERRED EMBODIMENT

A forming or rolling machine of the type contemplated by the present invention is partially illustrated at **10** in FIG. **1.** The rolling machine has a relatively massive frame, a portion of which is indicated at **11.** Upper and lower guide units **12** and **13** are secured to the frame by bolts **14** and include internally formed surfaces or guide tracks (not shown) for respectively receiving upper and lower powered slide members indicated at **16** and **17.** An elongaged forming die or rack is secured to each of the slide members, an upper forming rack being indicated at **18** and a lower forming rack being indicated at **19.**

The forming racks **18** and **19** are accordingly arranged within the forming machine for tangential engagement with a cylindrical workpiece indicated at **21.** The cylindrical workpiece is rotatably supported upon stationary locating centers or suitable cradles (not shown) which may, for example, be adjustably mounted upon the frame **11** of the forming machine.

Each of the racks **18** and **19** has a repetitive configuration of forming projections or teeth indicated at **22.** One preferred configuration and orientation of such forming teeth may be seen, for example, by having reference to the patent noted above. Generally, the teeth are arranged upon the racks so that as the racks are moved tangentially past the workpiece in opposite directions, the forming teeth penetrate the periphery of the cylindrical workpiece to form a peripheral configuration thereon.

The racks may be moved tangentially past the workpiece by means of hydraulic jacks such as that indicated at **23,** which is secured between the slide member **17** and the frame **11.** A similar jack (not shown) is also employed to simultaneously move the other slide member **16** and associated rack **18** in the opposite direction.

Referring now to FIGS. **2** and **3** as well as FIG. **1,** each of the racks **18** and **19** has a leading end, indicated respectively at **28** and **29.** The leading ends of the two racks simultaneously enter into tangential engagement with the workpiece prior to engagement of the workpiece with the forming teeth **22.** Generally, the metallic surfaces of the leading ends on the racks, as indicated at **31** in FIG. **2,** are spaced apart from each other to just engage the workpiece.

In order to assure that the workpiece is brought up to a rotating speed which is generally equal to the lineal speed of the racks **18** and **19** prior to engagement with the teeth **22,** anti-skid pads **32** and **33** are arranged upon the leading ends of the two racks **18** and **19** respectively. The anti-skid pad **33** arranged upon the leading end of the rack **19** is also illustrated in FIGS. **2** and **3.** It will, of course, be understood that the other antiskid pad **32** is to be of similar composition and configuration.

Initially, the anti-skid pads **32** and **33** are to be formed from material characterized as being abrasive, oil-resistant and resilient. Abrasiveness in the pads assures frictional engagement with the workpiece so that it will be properly set into rotation. Oil resistance of the pads is also important to resist the effect of cutting oils, which are commonly present upon the racks and the workpiece. Finally, the resilient anti-skid pads are arranged upon recessed surfaces **34** at the leading ends of the racks and extend slightly above the metallic sur-

faces **31** to assure interference engagement of the two pads with the workpiece. The pads also are selected to have a sufficient length along the forming axis of the racks to assure that the workpiece is brought up to the desired rotating speed before it enters into engagement with the teeth **22.**

The pads, which may be replaced, are secured to the recessed surfaces **34** by conventional means such as cement or mechanical retainer (not shown). The elastomeric pads are preferably formed from Buna N rubber having a durometer hardness of approximately **60** to **70.** This material exhibits the desired characteristics of abrasiveness, resilience and oil resistance.

What is claimed is:

1. In a rolling machine for forming a peripheral configuration on a rotatably supported cylindrical workpiece and having a housing with upper and lower guide means defined thereon, a pair of powered slide members respectively movable along said guide means transversely of the workpiece, and a pair of forming racks mounted upon said slide members for substantially simultaneous movement in opposite directions and having forming projections arranged for tangential engagement with the workpiece, the improvement comprising an anti-skid assembly for assuring proper rotation of the workpiece as it is initially engaged by the forming projections, the anti-skid assembly including a pad of abrasive, oil resistant and resilient material secured to a leading end of each forming rack, the pads being spaced apart from each other by a preselected distance to assure common interference engagement with the workpiece, the pads having a preselected length along the forming axis of the racks in order to bring the workpiece up to a desired rate of rotation commensurate with the lineal speed of the racks prior to its engagement with the forming projections.

2. The rolling machine of claim **1** wherein each pad is an insert of elastomer secured to a recessed surface on the leading end of each rack.

3. The rolling machine of claim **1** wherein each pad is an elastomeric insert having a durometer hardness in the general range of 60–70.

4. The rolling machine of claim **3** wherein each elastomeric insert is formed from Buna N rubber.

5. A gear or spline forming machine for rolling a plurality of teeth onto the periphery of a rotatably supported cylindrical workpiece, comprising:

a housing having upper and lower guide means defined thereon,

a pair of powered slide members respectively movable along said guide means transversely of the workpiece,

a pair of tooth-forming racks mounted upon said slide members for movement in opposite directions and having forming projections arranged for tangential engagement with the workpiece, and

an anti-skid pad formed from an abrasive, oil-resistant and resilient elastomeric material secured to a leading end of each forming rack for engagement with the workpiece prior to engagement of the workpiece with the forming projections, the elastomeric pads being spaced apart from each other by a preselected distance to assure common interference engagement with the workpiece, the pads having a preselected length along the forming axis of the racks in order to bring the workpiece up to a desired rate of rotation commensurate with the lineal speed of the racks prior to engagement of the workpiece with the forming projections.

6. The machine of claim **5** wherein each elastomeric pad is an insert secured to a recessed surface upon the leading end of each forming rack.

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