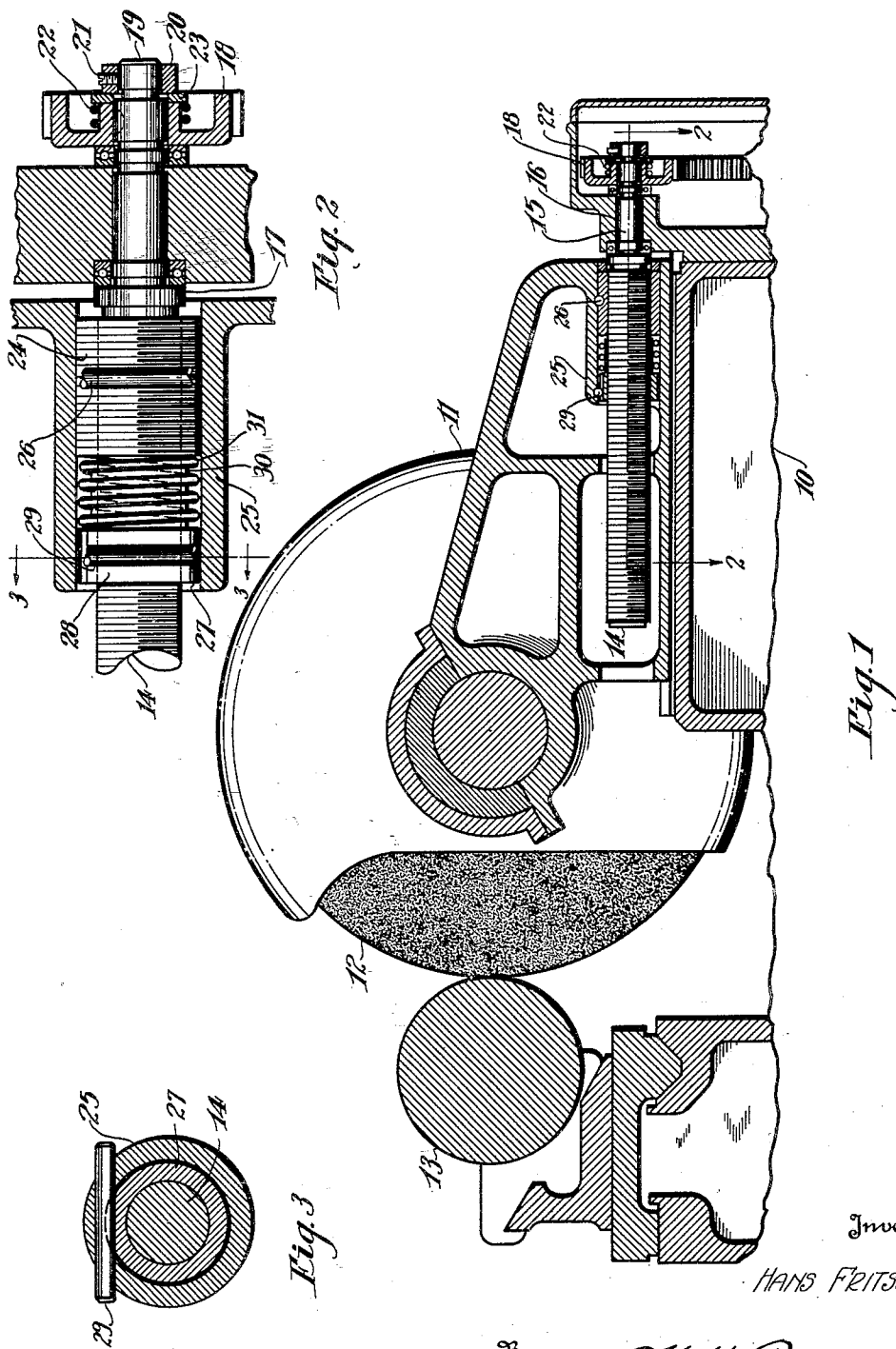


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GRINDING MACHINE
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GRINDING MACHINE

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This invention relates to feeding mechanism for wheel heads of grinding machines and more particularly to a backlash compensator for such mechanism.

5 In grinding machines a high degree of accuracy and precision is required and such performance depends largely upon the degree of perfection of the feeding mechanism for the grinding wheel. It is therefore an
10 object of this invention to provide an improved feeding mechanism for a grinding wheel, which will have no loose play in any of its parts between the bed of the machine on which it is mounted and the grinding
15 wheel itself.

Another object of this invention is to provide a generally improved backlash compensating device.

Other objects and advantages of the present invention should be readily apparent by reference to the following specification, considered in conjunction with the accompanying drawing illustrative of one embodiment thereof, and it will be understood that any
20 modifications may be made in the specific structural details hereinafter disclosed, within the scope of the appended claims, without departing from or exceeding the spirit of the invention.

30 Referring to the drawing, in which like reference numerals indicate like parts:

Figure 1 is a vertical section of the feeding mechanism;

35 Figure 2 is a section on the line 2—2 of Figure 1; and

Figure 3 is a section on the line 3—3 of Figure 2.

The reference numeral 10 indicates the base of the machine, upon which is slidably
40 mounted the wheel head 11 carrying the grinding wheel 12 for operation upon a work piece 13. A feed screw 14 is provided, for effecting relative adjustment between the wheel head and the base of the machine.
45 The feed screw has a journal 15 mounted in the bearing 16 provided in a fixed part of the base of the machine. An anti-friction thrust bearing is provided on each end of the journal 15 for engagement with the end portions
50 of bearing 16. A shoulder 17 of the feed screw

engages one of these bearings, and the gear 18, keyed to an extension of the journal 15, engages the other thrust bearing. The journal has a reduced end 19 upon which is
55 mounted a collar 20 having a set screw 21 for fastening it into place. A spring 22 surrounds the hub of the gear 18 and is compressed between the gear and a washer 23 mounted on the reduced end 19 and held
60 against longitudinal movement in one direction thereon by the collar 20, so that the spring, acting in one direction, holds the gear against its thrust bearing, and in the other
65 direction, acts through the washer 23, collar 20 and journal 15 to hold the shoulder 17 against its thrust bearing. Thus the spring acts to maintain the shoulder and gear in
constant engagement with the thrust bearings, preventing longitudinal movement of
70 the journal 15 in the bearing 16, with the result that the feed screw 14 will have no relative longitudinal movement with respect to the base 10.

Feed screw 14 is connected to the housing 11 by means of the feed nut 24 having a lost
75 motion compensator therefor. The wheel housing 11 is provided with a tubular housing 25, through which the feed screw extends. The feed nut 24 is mounted in one end thereof and held against relative longitudinal or rotative movement with respect
80 to the housing, by means of the pin 26. A lost motion compensating nut 27 is mounted on the feed screw 14 and within one end of the housing 25. This nut has a flat surface 28
85 which engages a pin 29 mounted in the housing, to prevent its rotation. Although the nut 27 is prevented from rotation, it is still capable of longitudinal movement with respect to the feed nut 24. The nut 27 has an
90 extended sleeve-like portion 30 which is surrounded by a spring 31 this spring extending between the nut 27 and the feed nut 24 and tending to constantly urge them in opposite directions. The effect is, that the nut
95 27 acts as an abutment for the spring, to push the feed nut longitudinally of the screw, thus taking up any lost motion or play between the feed screw and the feed nut.

Although this invention has been shown 100

as embodied in one type of grinding machine, the invention is not to be so limited but may be used on any type of grinding machine having an adjustable grinding wheel.

What is claimed is:

1. In a back lash and lost motion eliminator the combination of a shiftable member, a sleeve carried thereby, an adjusting screw extending through the sleeve for shifting the member, a nut carried by the sleeve and held against rotative and axial movement, the nut having a threaded engagement with the screw, a second nut threaded on the screw, means for locking the second nut against rotative movement but not axial movement relative to the sleeve and fixed nut, one of said nuts having a sleeve-like portion extending from it toward the other nut, and yieldable means surrounding the said sleeve-like portion and abutting on opposite ends with the nuts tending to actuate the same in opposite directions to thereby take up back lash between the adjusting screw and nuts.

2. In a back lash and lost motion eliminator the combination of a shiftable member, a support therefor, a sleeve carried by the member, an adjusting screw journaled in the support passing through the sleeve for shifting the member, a nut carried by the sleeve and held against rotative and axial movement relative to the member, the nut having a threaded engagement with the screw, a second nut on the screw, means for locking the second nut against rotative movement relative to the sleeve and fixed nut, one of said nuts having a sleeve-like portion extending from it toward the other nut, yieldable means surrounding the said sleeve-like portion and abutting on opposite ends with the nuts tending to actuate said nuts in opposite directions to thereby take up back lash between the adjusting screw and nuts, and additional means for eliminating lost motion between the adjusting screw and its support.

3. In a back lash and lost motion eliminator the combination of a shiftable member, a rotatable adjusting screw held against axial movement, a sleeve carried by the member through which the screw passes, a nut secured in the sleeve and in threaded engagement with the screw, a second nut within the sleeve in threaded engagement with the screw, said nut having a flat surface thereon, a pin carried by the sleeve engaging the said flat surface to prevent rotative movement of the said second nut but to permit axial movement thereof, and yielding means within the sleeve between the fixed nut and movable nut tending to axially shift the nuts relative to one another and the screw to thereby eliminate back lash and lost motion between the screw and fixed nut.

4. In a back lash and lost motion eliminator

for the combination of a shiftable member, a sleeve integral therewith, an adjusting screw, a support for the screw extending through the sleeve, a nut within the sleeve and pinned thereto against rotative and axial movement relative to the sleeve, the nut having a threaded engagement with the adjusting screw, a second nut on the screw spaced from the first nut and positioned within the sleeve, a flat surface on the nut, a pin carried by the sleeve and engaging the flat surface to prevent rotative movement of the second nut relative to the sleeve but permitting relative axial movement thereof, a sleeve-like guard extending from the second nut toward the fixed nut and overlying the screw threads, and a coiled spring surrounding the sleeve-like portion of the second nut and abutting on opposite ends with said second nut and fixed nut and tending to actuate said nuts in opposite directions to thereby eliminate back lash and lost motion between said nuts and the adjusting screw.

5. In a device of the class described the combination of a bed, a slide mounted thereon for movement relative thereto, a sleeve associated with the slide, a nut within the sleeve and pinned thereto to eliminate all inadvertent movement of the nut relative to the sleeve, an adjusting screw journaled on the bed and held against axial movement relative thereto and passing through the sleeve, the nut carried by the sleeve having a threaded engagement with the adjusting screw, a movable nut within the sleeve and threaded to the screw at a point spaced from the fixed sleeve nut, the second nut being free of the sleeve for movement relative thereto and having a flat surface thereon, a pin carried by the sleeve and engaging the nut flat surface to hold the nut against rotative movement relative to the sleeve and screw, and yielding means between the fixed nut and movable nut tending to axially shift said nuts relative to the screw and thereby shifting the movable nut relative to the sleeve and the fixed nut and sleeve relative to the movable nut for eliminating back lash and lost motion between the threads of the screw and the threads of the nut.

6. In a device of the class described the combination of a bed, a slide mounted thereon for movement relative thereto, a sleeve associated with the slide, a nut within the sleeve and pinned thereto to eliminate all inadvertent movement of the nut relative to the sleeve, an adjusting screw journaled on the bed and held against axial movement relative thereto and passing through the sleeve, the nut carried by the sleeve having a threaded engagement with the adjusting screw, a movable nut within the sleeve and threaded to the screw at a point spaced from the fixed sleeve nut, the second nut being free of the sleeve for movement relative thereto and

having a flat surface thereon, a pin carried by the sleeve and engaging the nut flat surface to hold the nut against rotative movement relative to the sleeve and screw, yielding means between the fixed nut and movable nut tending to axially shift said nuts relative to the screw and thereby shifting the movable nut relative to the sleeve and the fixed nut and sleeve relative to the movable nut for eliminating back lash and lost motion between the threads of the screw and the threads of the nut, a cylindrical guard extending from one of the nuts toward the other and underlying the yielding means to prevent inadvertent contact between the yielding means and screw threads.

7. In a device of the class described the combination of a bed, a slide mounted thereon for movement relative thereto, a sleeve associated with the slide, a nut within the sleeve and pinned thereto to eliminate all inadvertent movement of the nut relative to the sleeve, an adjusting screw journaled on the bed and held against axial movement relative thereto and passing through the sleeve, the nut carried by the sleeve having a threaded engagement with the adjusting screw, a movable nut within the sleeve and threaded to the screw at a point spaced from the fixed sleeve nut, the second nut being free of the sleeve for movement relative thereto and having a flat surface thereon, a pin carried by the sleeve and engaging the nut flat surface to hold the nut against rotative movement relative to the sleeve and screw, yielding means between the fixed nut and movable nut tending to axially shift said nuts relative to the screw and thereby shifting the movable nut relative to the sleeve and the fixed nut and sleeve relative to the movable nut for eliminating back lash and lost motion between the threads of the screw and the threads of the nut, a cylindrical guard extending from one of the nuts toward the other and underlying the yielding means to prevent inadvertent contact between the yielding means and screw threads, the screw having a portion extending beyond its journal in the bed, a gear on the extended portion of the screw, a collar for securing the gear to the screw extension, and yielding means between the gear and collar for shifting the screw relative to its journal to eliminate lost motion therein.

In testimony whereof I affix my signature.

HANS FRITSCHL.