

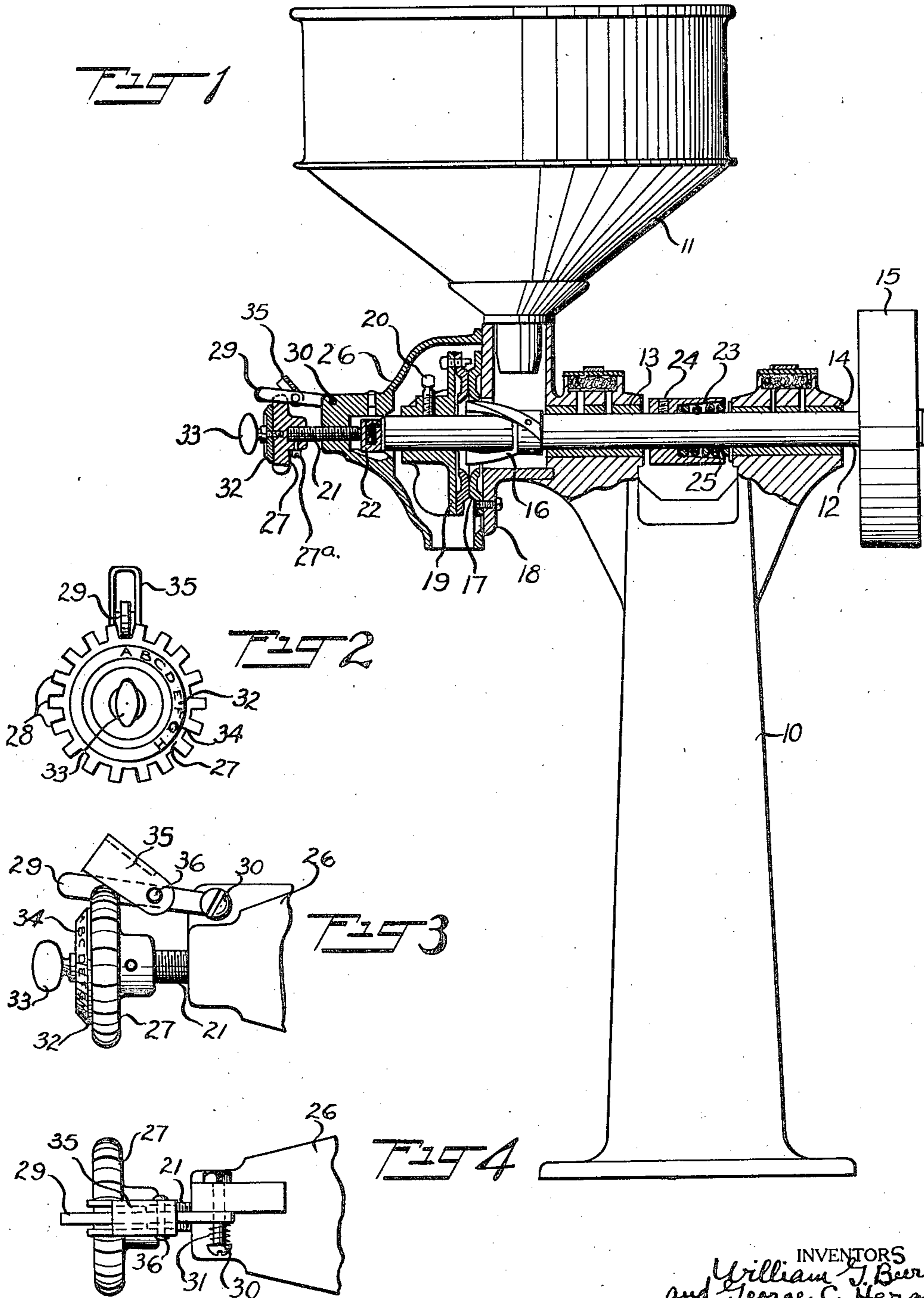
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W. G. BURNS ET AL

GRINDING MILL

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UNITED STATES PATENT OFFICE.

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GRINDING MILL.

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To all whom it may concern:

Be it known that we, WILLIAM G. BURNS and GEORGE C. HERZ, both citizens of the United States, and residents of New York, county of New York, State of New York, and Flushing, Long Island, in the county of Queens and State of New York, respectively, have invented certain new and useful Improvement in Grinding Mills, of which the following is a specification.

This invention relates to grinding mills, and has for its object to provide an improved grinding adjustment indicating means whereby an adjustment once obtained for a desired fineness of grind, such as of coffee, can be definitely reproduced in a new machine, or in the same machine upon reassembling after cleaning, sharpening, adjustment for another grind, or replacement of old grinding elements by new.

The invention is especially applicable to power driven mills, such as the flat disc type, used by wholesale and large retail roasters and grinders of coffee, who when they once determine a satisfactory or standard fitness of grind for a given blend or customer, desire to reproduce the same adjustment of the grinder at any time, without cut and try or guess methods, notwithstanding change of adjustment for other fineness, or disassembling to sharpen discs, clean the machine, or replace old discs by new. In mills heretofore devised, while it has been possible to obtain the desired adjustment for any given fineness of grind, exact reproduction thereof after disassembling of the machine, or wear of the discs, has not been definitely and easily possible even with the use of notched distance adjusting screws and a latch to engage in the notches. Numbering of the notches or adjustment of the notched hand wheel on the shaft is not sufficient, because of variation in discs, and wear of threads, bearings, and discs. The best that could heretofore be done has been to cut and try with more or less approximation to repetition of a previous grind, depending on the care of the operator and his ability to tell by eye how close a grind from a new adjustment is to a previous or desired standard grind. Moreover, in the coffee trade particularly, there is an increasing tendency to establish definiteness in the fineness of grinding by the use of reference samples of work previously

ground, and a manufacturer, desiring to conform to such standard grinds, consequently requires more precision of adjustment in his grinding mills, and an ability to accurately and quickly reset a machine for any desired one of the several standard grinds provided for.

The invention of this application accomplishes the foregoing results by providing in combination with the present day notched, angularly adjustable hand wheel, an adjustable index plate lettered for standard grinds and so mounted and arranged as to enable any desired grind to be quickly reproduced at will. In further combination, is a novel form of double latch cooperating with the notched wheel, so that intermediate standards can be obtained, if desired, thus doubling the number of standard grinds obtainable.

In the accompanying drawings:

Fig. 1 is a longitudinal section through a mill embodying the present invention,

Fig. 2 is an end view of the scale and latching device,

Fig. 3 is a side view of the device of Fig. 2,

Fig. 4 is a top view of the devices shown in Figs. 2 and 3.

For the purposes of illustration this invention has been embodied in a grinding mill of the customary type illustrated wherein the pedestal 10 supports the mill which comprises the feed hopper 11 and rotatable spindle mounted in bearings 13 and 14 and driven by the pulley 15, or other source of power. Below the feed hopper is a screw conveyor 16 attached to the shaft which moves the fed in material towards the grinding elements 17 and 19, the former of which is stationary and bolted, or otherwise secured to the stationary housing 18, while the latter, or rotatable grinding element 19 is adjustably secured to the spindle 12 by the set screw 20. A threaded member 21 engages a thrust block 22 for moving the spindle 12 against the action of the compression spring 25 contained between the clearance spring collar 23 and the bearing 14. The spring 25 is normally under compression and tends to force the spindle 12 against the thrust block and into co-operation with the threaded member 21 which controls the spacing between the grinding elements 17 and 19, and therefore controls

the grade of product, fine or coarse, as desired. The clearance spring collar 23 is secured to the spindle 12 by a set screw 24, or other convenient means.

5 A spring in co-operation with the stationary housing 18, and the yieldable frame or housing 26 enables the rotatable grinding element 19, spindle 12, and housing 26 to be all moved to the left in Fig. 1, if a piece of
10 iron or other hard substance of large size gets wedged in between the grinding elements 17 and 19; with the result that the spacing between these elements enlarges until the obstruction has passed through,
15 whereby mutilation of the grinding elements is guarded against. The hand wheel 27 controls the adjustment of the threaded member 21 and this hand wheel is shown in Figs. 2, 3 and 4 as being provided with a plurality
20 of teeth 28 on its periphery and secured to the threaded member 21 by the set screw 27^a, or other convenient means. Pivoted to the frame or housing 26 by the pin 30 is a latch 29 for locking the hand wheel 27 in adjusted
25 position, and adapted to fit in between the teeth 28 without any lost motion, so as to hold the wheel 27 in accurate adjustment. A spring 31, arranged between the head of pin 30 and the latch 29, may provide the
30 necessary friction to retain the latch in either of its positions without danger of its becoming displaced. A thumb screw 33 clamps the scale or index plate 32 firmly against the hand wheel 27 to hold this plate
35 in adjusted position. Letters 34 or other appropriate indicating symbols are placed on the index plate for the purpose of designating the grade of coarse or fine product obtained when the latch or pointer 29 is be-
40 side a particular letter. Pivoted at 36 to the first latch is a second latch 35 of inverted U-shape having the sides of the U longer than the depth of the latch 29 so that when latch 29 goes over a tooth 28 instead of
45 between the teeth, the second latch 35 is adapted to span the first latch and without lost motion fit on opposite sides of the tooth over which the first latch is held. In this way an increased number of grades of prod-
50 uct is obtainable.

In operation the machine is assembled and the hand wheel and threaded member moved to force the spindle 12 to the right until the grinding discs 17 and 19 are in a contacting
55 position, where they have a minimum grinding clearance. The hand wheel 27 is then adjusted by means of its set screw 27^a, until the latch 29 is directly between a pair of teeth to properly engage and lock the hand
60 wheel, or instead the wheel 27 may be adjusted so that the channel shaped or inverted U latch 35 is in proper engagement with the wheel when the discs are in such position of minimum grinding clearance. After the
65 hand wheel 27 has been locked in its ad-

justed position, as described, the index plate 32 is adjusted by loosening the screw 33 and moving said index until the zero or A is opposite, the latch 29, so that such graduation
70 will designate the finest powder grind. The index is next clamped in its adjusted position by the screw 33. If the hand wheel is then turned until a desired mark, A, B, C, etc., is opposite the latch 29, engaging the
75 latch sets the mill so it will accurately produce the corresponding grind, and it will also be seen that this ability of the mill to obtain the desired grind is independent of the adjustment of the rotary grinding disc 19 on the spindle 12 and may be made inde-
80 pendent of the gradual wear which takes place in any machine.

Among the advantages of this invention may be enumerated the facility to obtain the
85 desired grade of product without the necessity for cut and try methods, and the ability to obtain such desired grade without reference to the wear in the machine, or the adjustment of the grinding disc on the spindle. By means of this invention an operator
90 using a plurality of mills can set them up alike, or such an operator could set new machines to produce the same grind as the old machines, and could reset the old ones to compensate for wear. Another advan-
95 tage is that this invention may be embodied and applied to old machines whereby they may be calibrated to indicate the desired grade of product with accuracy and without the necessity for test runs. The invention is
100 not limited to mills of the type shown but may also be embodied in machines having cone type of grinding elements, and those of other than disc illustrated.

We claim:

1. In a mill, the combination with relatively movable grinding elements, of means for adjusting the separation of said elements, means for locking the adjusting
110 means, a relatively movable scale and pointer for indicating contact relation between said elements, and a plurality of separations thereof, and means for adjusting the relation between said scale and
115 pointer to indicate contact between said elements whereby a definite separation of said grinding elements may be produced regardless of wear.

2. In a mill, the combination with a stationary grinding element, of a movable
120 grinding element, mechanism including a toothed wheel for adjusting at least one of such elements to control their separation, a frame therefor, a latch secured to said frame to engage said toothed wheel and lock the
125 same to operatively maintain said elements in adjusted position, a scale secured to the toothed wheel and provided with a mark to indicate a contacting position of said elements, and also having other marks to indi-
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cate different separations of said elements, said latch serving as a pointer for the scale and being relatively fixed, and an adjusting means for the scale whereby it may be moved to indicate said contacting position of the elements regardless of their wear and adjustment.

3. In a mill, the combination with a stationary grinding element, of a movable grinding element, mechanism including a toothed wheel for adjusting at least one of such elements to control their separation, a frame therefor, a latch secured to said frame to engage said toothed wheel and lock the same to operatively maintain said elements in adjusted position, a scale secured to the toothed wheel and provided with a mark to indicate a contacting position of said elements, and also having other marks to indicate different separations of said elements, said latch serving as a pointer for the scale and being relatively fixed, means for adjusting said toothed wheel relative to the grinding element controlled thereby, and an adjusting means for said scale whereby it may be moved to indicate said contacting position of the elements and predetermine the grade of product regardless of wear and adjustment of the elements.

4. In a mill, the combination with a stationary grinding element, of a movable grinding element, mechanism including a toothed wheel for adjusting at least one of such elements to control their separation, a frame therefor, a latch secured to said frame to engage said toothed wheel and lock the same to operatively maintain said elements in adjusted position, a scale secured to the toothed wheel and provided with a mark to indicate a contacting position of said ele-

ments, and also having other marks to indicate different separations of said elements, said latch serving as a pointer for the scale and being relatively fixed, another locking means for the toothed wheel for cooperation therewith when the latch is over a tooth and cannot lock the wheel, and an adjusting means for the scale whereby it may be moved to indicate said contacting position of the elements regardless of their wear and adjustment.

5. In a mill, the combination with a grinding element, of a toothed means controlling the position of said element and the grade of product, a latch movable to a position between the teeth of said means to lock the same in adjusted position, and another latch pivoted to said first mentioned latch and adapted to fit between the teeth and lock said means when the first latch is over a tooth.

6. In a mill, the combination with a stationary grinding element, of a rotary grinding element co-operating therewith, a spindle on which said rotary element is removably mounted, means for axially moving said shaft to adjust said rotary element and control the grade of the product, a scale carried by said shaft moving means, a latch to lock said spindle moving means, and means whereby said scale may be adjusted to indicate the separation between said elements and the grade of product independently of the position of said rotary element on said spindle.

Signed at New York, in the county of New York and State of New York, this 11th day of September, A. D. 1923.

WILLIAM G. BURNS.
GEORGE C. HERZ.