Jan. 27, 1953 E. N. MEAKIN 2,626,576

ROLLER ADJUSTMENT INDICATOR FOR PELLET MILLS

Filed Dec. 10, 1948 2 SHEETS—SHEET 1

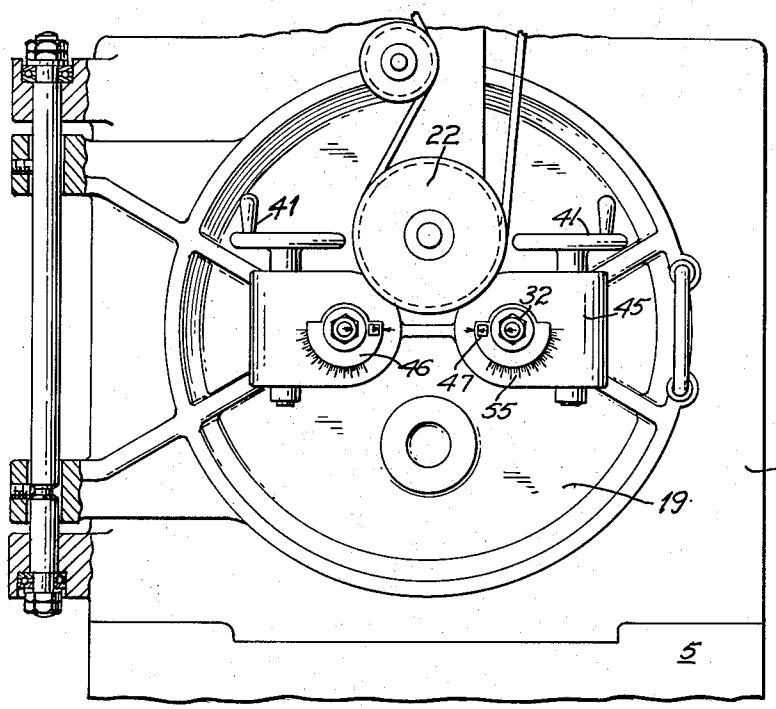

Fig. 1.

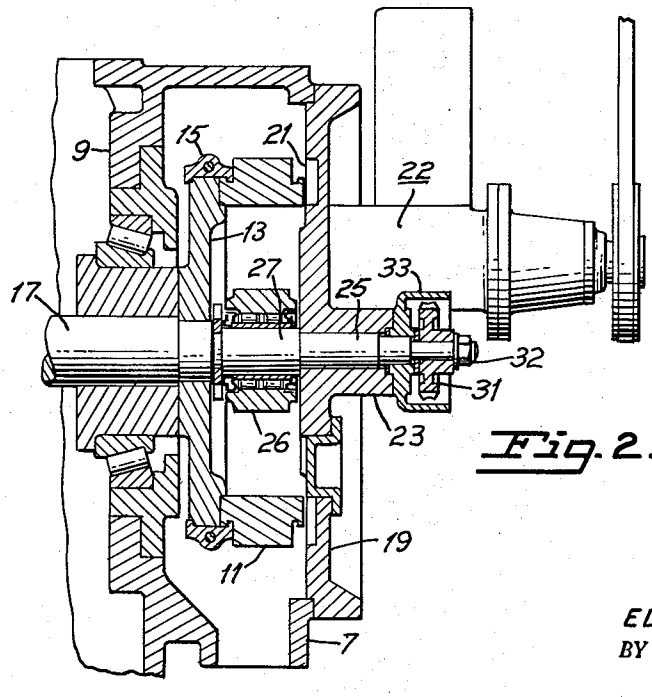

Fig. 2.

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ROLLER ADJUSTMENT INDICATOR FOR PELLET MILLS

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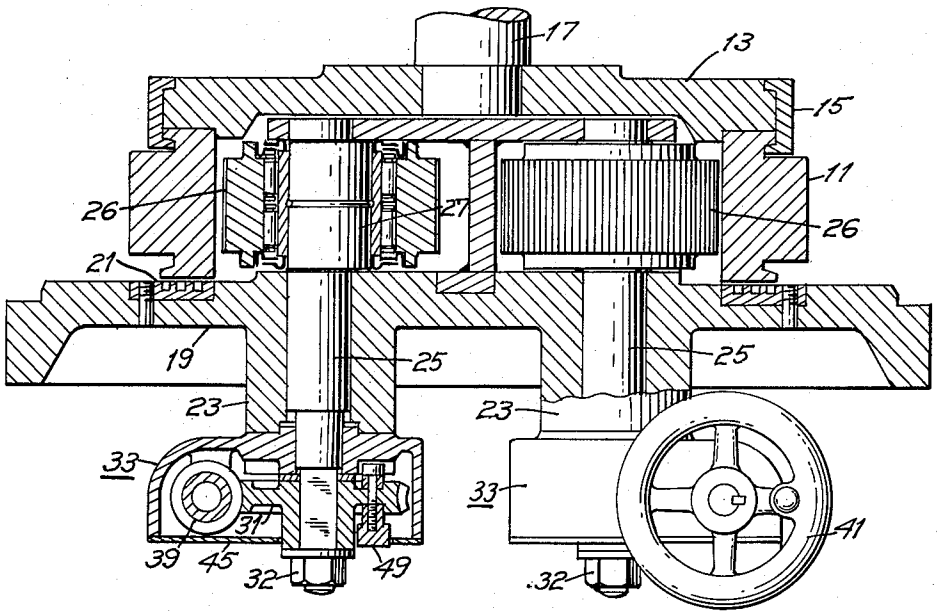

Fig. 3.

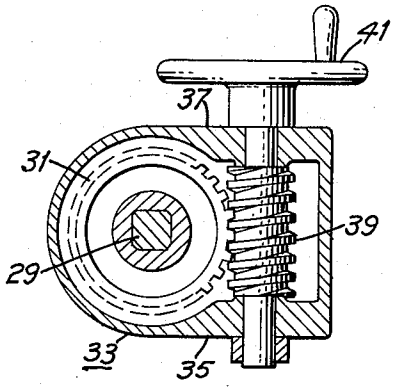

Fig. 5.

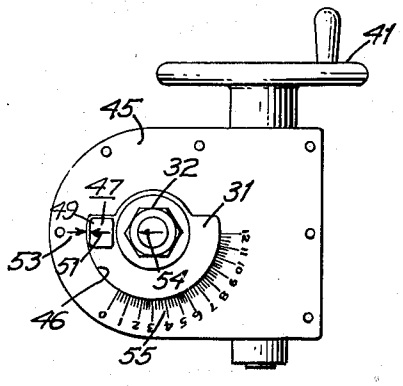

Fig. 4.

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2,626,576

ROLLER ADJUSTMENT INDICATOR FOR PELLET MILLS

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Application December 10, 1948, Serial No. 64,617

5 Claims. (Cl. 107—14)

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My invention relates to pellet mills or the like, and more particularly to an adjustment indicator for the compression means in such mill, such compression means usually being in the form of one or more compression rollers.

The invention is particularly applicable to mills of the type described in Meakin patent for Extrusion Mill, No. 2,336,114, of December 7, 1943, wherein the compression means is a roller supported on a hingedly mounted door spanning a horizontally disposed compression chamber.

In cleaning out the compression chamber in such mill or in effecting repairs or replacements therein, an initial lifting of the roller from the die is essential to permit such roller to swing clear of the die, as the door is opened. Consequently, not only is it desirable, in such a case, to have some positive indication that the roller is sufficiently removed from contact with the die to permit clearance upon opening of such door, but, in replacing the roller, it is desirable to be able to quickly and accurately reestablish the roller adjustment previously existing between the roller and the die.

The invention, in its preferred form, has been depicted in a mill of the type disclosed in the aforementioned patent but utilizing a pair of compression rollers, and for a detailed description of such preferred form of the invention, reference will be had to the accompanying drawings wherein—

Figure 1 is a fragmentary front elevational view of such mill embodying my invention;

Figure 2 is a fragmentary side elevational view in section through the pertinent portion of the mill of Figure 1;

Figure 3 is a view partly in section, through the adjusting and indicating mechanism of the present invention;

Figure 4 is a front elevational view of the adjusting and indicating mechanism of the present invention;

Figure 5 is a view in section, through the mechanism of Figure 4.

The particular mill illustrated comprises a housing 5 having a front wall 7 and a parallel disposed partition wall 9 determining a section of the housing within which the extrusion function of the mill takes place. The die 11 is preferably of cylindrical shape, clamped to a backing disk 13 forming one end wall of the compression chamber. Clamping of the die to the disk is effected by a plurality of clamping elements 15 distributed about the periphery of the disk and die, each of such elements being bolted to the

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edge of the backing disk and engaging in a peripheral edge groove in said disk and a corresponding groove around the die.

The backing disk is preferably integrally united to one end of the die shaft 17 which extends through the partition wall for drive connection to a suitable power source such as an electric motor (not shown). Thus the die is adapted for rotation in the operation of the specific mill under consideration.

The front wall of the housing is provided with an opening therethrough concentric with and of greater diameter than the entrance to the compression chamber formed by the cylindrical die and the backing disk. Such opening is adapted to be closed by a door 19 hinged to the front wall of the housing, the door being provided with a circular insert 21 facing the free edge of the cylindrical die and having a plurality of circular grooves on its exposed surface. The door is thus adapted to function as a closure for the compression chamber and constitute the front end wall thereof when in its closed position.

A screw feed assembly 22 affixed to the door is adapted to feed through the door and into the compression chamber, material to be compressed and extruded through the die.

The door is formed with a pair of spaced bosses 23 each having a longitudinal passage therethrough for a stub shaft 25 which extends into the compression chamber and provides a support on which to mount a compression roller 26. That portion 27 of each such shafts, which lies within the chamber, has its axis eccentric to the axis of the stub shaft proper. Such eccentric relationship permits of adjustment of the roller with respect to the inner or compression surface of the die, through partial rotation of the stub shaft, and the location of the bosses in which the stub shafts are mounted, is such as to permit of such adjustment of each roller from a position in spaced relationship with respect to the die, to a position in compression contact with the surface of the die. In this manner, wear on the part of the roller or die may be compensated for.

Such adjustment is made possible by squaring off the outer end 29 of the stub shaft and mounting thereon a gear 31 which is held thereon by a lock nut 32. The gear is enclosed by an open-faced shroud 33 which provides spaced bearings in its side walls 35, 37 for a worm 39 which is held in mesh with the gear. At one end of the worm shaft there is mounted a hand-operated adjusting wheel 41 to permit of manual ro-

tation of the worm to effect adjustments of the associated roller.

The shroud at its open end, is closed by a plate **45** having an opening **46** therein exposing the lock nut end of the stub shaft together with an arcuate portion of the gear lying adjacent the stub shaft.

With a roller adjusted to its maximum spaced relationship with respect to the compression surface of the die, a marker **47** is applied to the gear adjacent one end of the exposed arcuate portion thereof. Such marker may be in the form of a nut **49** bolted to the gear and carrying on its face an indicia in the form of an arrow **51**. A corresponding indicia or arrow **53** is applied to the plate **45** in registry with the arrow **51**, at a point on the edge formed by the opening through the plate.

An indicia such as an arrow **54** on the exposed end of each stub shaft and corresponding in direction with that on the gear marker, will facilitate the proper orientation of a gear when assembled on the shaft.

Any manipulation of the adjusting mechanism from the position representing maximum spaced relationship between the roller and the die surface will bring the roller closer to the die until a desired pressure contact with the compression surface of the die is established. Such adjusting movement of the roller will be represented on the indicator by movement of the marker along an arcuate path coinciding with the exposed arcuate portion of the gear. The extent of such arcuate path of travel will vary, of course, with wear of the roller and of the die.

Prior to opening of the door to the compression chamber, the rollers must be backed off from their pressure contact with the surface of the die, and accordingly the handwheel associated with each roller control mechanism will be rotated until the arrow on the marker is brought back to a position of registry with the arrow on the plate, thus indicating maximum spacing of the roller with respect to the die.

In restoring the mill to operation, it is desirable, if the same rollers are used, to be able to quickly and accurately restore such rollers back to their previous pressure contact relationships with respect to the die, and this is made possible by adding to each plate, a scale **55** along the edge bordering the arcuate path of travel of the marker. With such scale available, the adjustment of the roller associated with that particular control mechanism may be noted prior to destroying such adjustment in preparation for opening of the door to the compression chamber. Thereafter, following the replacement of such rollers, the previous adjustment of the rollers may be then restored, quickly and accurately, by restoring the marker back to the position on the scale which it occupied just previously.

The lock nut **32** may be relied on to preclude any undesirable tampering with the adjusting mechanism. Consequently, when an adjustment is to be made, such lock nut must first be loosened to free the adjusting mechanism for operation.

The indicator of the present invention thus performs two very desirable functions in connection with adjusting of the rollers within the compression chamber. First, it enables an operator to quickly, and with assurance, ascertain the maximum spacing of the rollers with respect to the die in preparation for removal of such rollers from the compression chamber; and secondly, where the same rollers are to be returned to the compression chamber, the indicator enables them to be quickly and accurately restored to the same pressure contact relationship which existed just prior to their removal from the compression chamber.

It will thus be apparent that the invention as described above in its preferred form, fulfills all the objects of the present invention. While the invention has been illustrated and described in its preferred form and in connection with a particular type of pellet mill, the same is applicable to other types of mills and is subject to alteration and modification without departing from the underlying principles thereof; and I, accordingly, do not desire to be limited in my protection to the specific details illustrated and described, except as may be necessitated by the appended claims.

I claim:

1. In apparatus involving a die, defining in part, a compression chamber, a compression roller, means including a shaft supporting said roller in cooperative relationship to the compression surface of said die, and means for adjusting said roller between a position of maximum spacing from said die and a position of pressure contact with the compression surface of said die, said means including a gear mounted on said shaft and a rotatable worm drive coupled to said gear; means for indicating the condition of maximum spacing of said roller with respect to said die, said indicating means including a marker affixed to said gear and movable over an arc path with rotation of said gear, and an indicator at a point along said arc path reached by said marker when such spacing is maximum; and means for denoting the extent of rotation of said gear from its maximum spacing determining position, which is necessary to reestablish a previously existing roller-die relationship, said means including a scale disposed along the arc path of movement of said gear mounted marker.

2. In apparatus involving a die, defining in part, a compression chamber, a compression roller, means supporting said roller in cooperative relationship to the compression surface of said die, said means including a roller shaft having one end extending into said compression chamber on an axis eccentric to the main axis of said shaft and adapted to mount said roller, and means mounted on the other end of said shaft for adjusting said roller between a position of maximum spacing from said die as permitted by the eccentric portion of said shaft and a position of pressure contact with the compression surface of said die, said means including a gear mounted on said shaft and a manually rotatable worm drive coupled to said gear; means for indicating the condition of maximum spacing of said roller with respect to said die, said indicating means including an element affixed to said gear and movable over an arc path with rotation of said gear, and an indicator at a point along said arc path reached by said element when such spacing is maximum; and means for denoting the extent of rotation of said gear from its maximum spacing determining position, which is necessary to reestablish a previously existing roller-die relationship, said means including a scale disposed along the arc path of movement of said gear mounted element.

3. Indicating means for indicating the position of a compression roller with respect to an associated die; comprising a circular element, an open-faced shroud enclosing said circular ele-

ment, means for rotating said circular element in the operation of adjusting the spacing between such roller and die, a plate affixed to said shroud across the open face thereof and having an opening therein exposing an arcuate portion of said circular element, an indicating indicia on said plate adjacent an edge of said opening, a marker on the exposed portion of said circular element in alignment with said indicia when said circular element is in the rotational position occupied during maximum spacing of such roller from such die, and a scale on said plate along the edge of said opening traversed by said marker during rotation of said circular element.

4. Indicating means for indicating the position of a compression roller with respect to an associated die; comprising a gear, an open-faced shroud enclosing said gear, a worm supported in mesh with said gear, an adjusting wheel mounted at one end of said worm, a plate affixed to said shroud across the open face thereof and having an opening therein exposing an arcuate portion of said gear, a marker on the exposed portion of said gear, and a scale on said plate along the edge of said opening traversed by said gear marker during rotation of said gear.

5. Indicating means for indicating the position of a compression roller with respect to an associated die; comprising a gear, an open-faced shroud enclosing said gear, a worm supported in said shroud in mesh with said gear, an adjusting wheel mounted at one end of said worm, a plate affixed to said shroud across the open face thereof and having an opening therein exposing an arcuate portion of said gear, an indicating indicia on said plate adjacent an edge of said opening, a marker on the exposed portion of said gear in alignment with said indicia when said gear is in the rotational position occupied during maximum spacing of such roller from such die, and a scale on said plate along the edge of said opening traversed by said gear marker during rotation of said gear.

EDGAR N. MEAKIN.

REFERENCES CITED

The following references are of record in the file of this patent:

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Number	Name	Date
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