March 3, 1959 H. S. LANDERS 2,875,709

PRESSURE ROLLER FOR PELLET MILL

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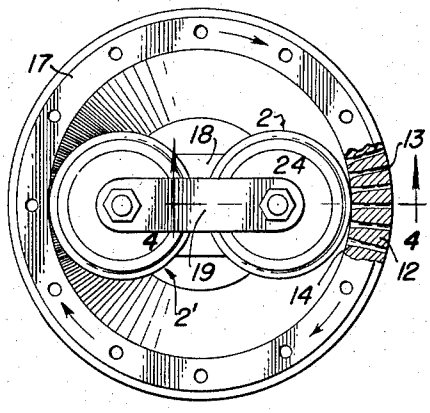


FIG. 2.

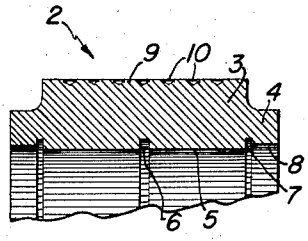


FIG. 3.

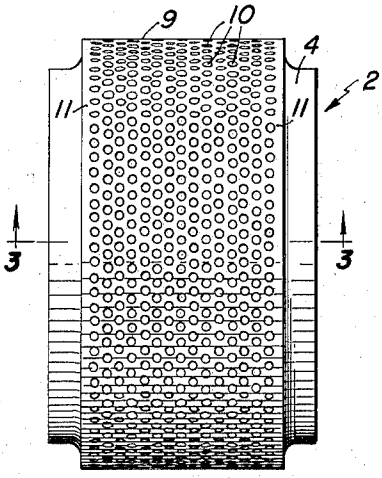


FIG. 1.

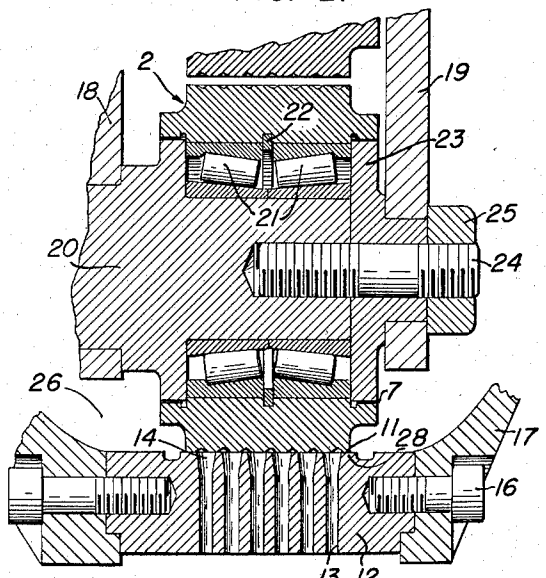


FIG. 4.

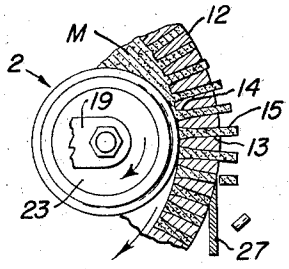


FIG. 6.

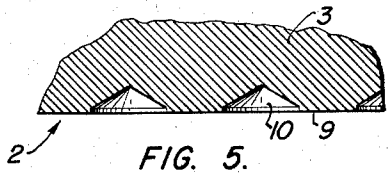


FIG. 5.

HARVEY SMITH LANDERS

INVENTOR.

BY Herbert J. Brown

ATTORNEY

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PRESSURE ROLLER FOR PELLET MILL

Harvey Smith Landers, Fort Worth, Tex.

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3 Claims. (Cl. 107—14)

This invention relates generally to pellet mill equipment and more particularly to an improved device of this type for producing compacted feed pellets.

The primary object of this invention is to provide a pressure roller for a pellet mill which will produce more satisfactory pellets with less pressure against the die.

Another object is to provide a roller for use with a conventional feed pellet mill die whereby the roller will prevent the customary "squeezing" loss which occurs along the sides of the roller and die.

A further object is to provide a pressure roller which will increase the life of both the roller and the die due to the evenly distributed point of contact and traction between the two members.

And another object is to provide a pressure roller which together with a feed pellet mill die can handle feed having a much greater range of moisture or steam content than can be handled using a conventional roller.

An additional object is to provide an improved pressure roller for use with different pellet mill dies rather than requiring the present "matched set" method of operation and maintenance replacement.

And yet another object is to provide a pressure roller which has a band of solid material at each lateral edge to engage a corresponding band of solid material on the mating die to both reduce edge wear and gain additional production of the mill.

These and other objects will be apparent from an examination of the following specification and drawing in which:

Figure 1 represents a top plan view of the improved pressure roller of this invention.

Figure 2 is an end view of the roller of this invention installed in a conventional pellet mill and showing a fragmentary cut-away section through the pellet mill die.

Figure 3 is a fragmentary cross sectional view taken along the lines 3—3 of Figure 1.

Figure 4 is a fragmentary cross sectional view taken along the lines 4—4 of Figure 2.

Figure 5 is an enlarged fragmentary view of a short section of Figure 3 for showing the details of the roller dimples.

Figure 6 is a fragmentary view of a portion of Figure 2 while the mill is in operation and showing the cooperating relationship of the roller and die.

Referring now more particularly to the characters of reference on the drawing, the roller 2 comprises a solid center ring 3 of material suitable for subsequent case hardening and a reduced diameter to form end sections 4 and which has closely machined inner diameters to form bearing seats 5, spacer groove 6, seal grooves 7, and retainer shoulders 8. Along the outer surface 9 there are drilled a multiplicity of short depth shallow holes or cavities 10 around the entire circumference of roller 2 except near each edge of roller 2 whereat a small continuous band 11 of solid material is intentionally provided.

The arrangement shown in Figures 2, 4 and 6 is typical for many current feed pellet mills wherein the die 12 includes a plurality of pellet holes 13 which may be tapered at their entrance 14 to facilitate compaction of the pellets 15. Die 12 is secured by capscrews 16 in a die drive plate 17 which is driven by a power mechanism (not shown) to impart rotation to die 12. Roller 2 is held in close contact with die 12 by means of a fork 18 and a strap 19. A pair of shafts 20 support opposed tapered roller bearings 21 which are separated by spacer 22 in groove 6 and each shaft 20 engages a retainer 23 and stud 24 which in turn engages nut 25 to bind strap 19 in place. A grease seal (not shown) may be installed in grooves 7, and bearings 21 are so installed that the inner race, shaft 20, retainer 23 and plate 17 remain stationary while the outer race and roller 2 may freely rotate upon urging from the power driven die ring 12. The area between the inner circumference of die 12 and the outer circumference of rollers 2 and 2' is known as the pelleting chamber 26 and the feed material M to be pelleted is fed into this chamber from a feed spout (not shown). The material may in one instance be ground (powdered) livestock feed which is partially saturated with steam to give it the necessary moisture content to bind together upon compaction. The power rotation of die 12 as shown by the arrows (Figure 6) draws the loose bulk material M into the converging area between die 12 and roller 2 so that it is forced into and through pellet holes 13 wherein it is further pressurized by passing through tapered entrance groove 14, and as die 12 rotates further the exposed pellets 15 are cut off by knives 27 and drop down into a conveyor or other means for packaging or storage.

At each edge of die 12 (Figure 4) there is a continuous band 28 which is wider than the corresponding mating band 11 of roller 2 to account for slight misalignments in a lateral direction. The roller 2 and die 12 operate in a touch-control relation so that there is no room between bands 11 and 28 for material M to squeeze out laterally as is the common occurrence when using a corrugated roller having lateral bands. It will also be noted that much less pressure is required to obtain satisfactory operation with the combination shown in Figure 4 than when using a corrugated (tooth) roller since the material M is under control rather than able to shoot out sideways by means of the exposed lateral bands. There is also no tendency for the edges of rollers to wear down in conventional corrugated dies. The entire outer circumference 9 may be case-hardened and polished after drilling is completed to further increase its wearability.

The invention is not limited to the exemplary construction herein shown and described, but may be made in various ways within the scope of the appended claims.

What is claimed is:

1. A pressure roller for a pellet mill comprising: a circular ring having a smooth circumferential outer surface, a band of solid continuous surface adjacent each lateral edge of said ring, and a multiplicity of short depth radially drilled tapered holes in said outer surface in closely spaced relationship between said bands, said outer surface being case hardened throughout its circumference.

2. In a pellet mill including a circular die having a plurality of pellet holes radially disposed therein and including a support for retaining a pressure roller thereon for rotary motion and providing a power driven relationship between said die and roller; a roller comprising a continuous outer circumferential surface for mating with the inner circumferential surface of said die, said roller including a continuous band at each lateral edge thereof, and a multiplicity of short depth radially drilled tapered holes in said outer surface between said bands and in staggered rows of alignment between said bands, said

outer surface being hardened and polished throughout its circumference.

3. In a pellet mill including a circular die having a plurality of pellet holes radially disposed therein and including a support for retaining a pressure roller thereon for rotary motion and providing a power driven relationship between said die and said roller; a roller comprising a continuous outer circumferential surface for mating with the inner circumferential surface of said die, said roller outer circumference including a band of continuous surface at each lateral edge thereof and a multiplicity of round cavities in said outer circumference between said bands, said cavities being arranged in transverse rows, the number of cavities in any one row being

at least equal to the transverse number of holes in said die.

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