

G. PALMER.
Bone-Mills.

No. 216,102.

Patented June 3, 1879.

Fig: 1.

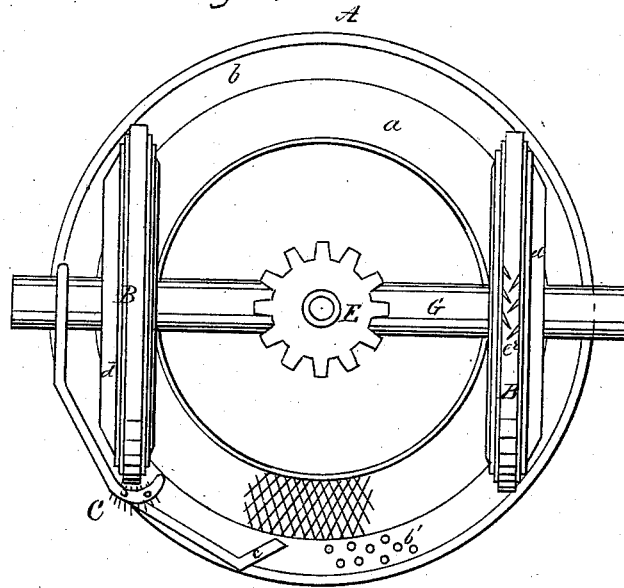
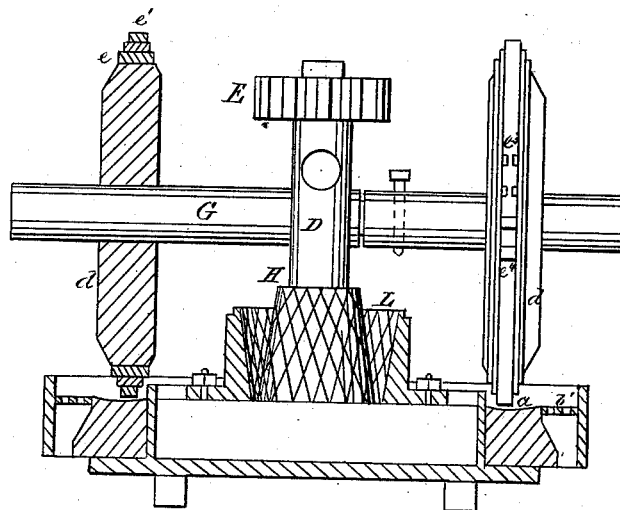


Fig: 2.



WITNESSES
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GEORGE PALMER, OF LITTLESTOWN, PENNSYLVANIA.

IMPROVEMENT IN BONE-MILLS.

Specification forming part of Letters Patent No. **216,102**, dated June 3, 1879; application filed February 26, 1879.

To all whom it may concern:

Be it known that I, GEORGE PALMER, of Littlestown, in Adams county and State of Pennsylvania, have invented an Improvement in Bone-Mills, of which the following is a specification.

This invention is designed to reduce the raw or undried bone to a pulverized state, whereby all the constituent animal matter, as well as the phosphates and carbonates, is retained, and a fertilizer of very superior quality is produced.

All efforts heretofore made to reduce the raw bone to powder have failed, in whole or in part, owing to the large proportion of animal matter contained—say, about thirty-three (33) percent.—and which is lost if boiled, which causes it to compact, mat or conglutinate instead of pulverizing.

My invention consists in a novel construction of grinding-wheel, operating on the principle of the Chilian mill, having great weight for crushing effect, with but small bearing or grinding surface on its periphery, whereby the compacting is avoided and the pulverized material allowed to escape from under the crushing weight.

I will now describe my invention by referring to the drawings, in which—

Figure 1 represents a top view of my machine, and Fig. 2 a central vertical section in part.

The same letters appearing on both figures indicate like parts.

A represents the bed or floor of the mill, which is composed of an annular course, *a*, on which the rollers B travel to perform their grinding operation. This course may be made of cast or wrought iron or steel, either smooth or roughened on the surface. Around this is another annular plate, *b*, perforated with small holes, as at *b'*, onto which the pulverized bone passes from the grinding-floor, and is kept moving by the scraper *c*, to sift it through the holes. The grinding-floor *a* may, furthermore, be slightly concave on its surface, to cause the coarser portions to roll back under the rollers B until thoroughly pulverized.

The rollers B are composed of a central portion, *d*, of stone or metal, to give the required weight. Around this is a series of bands or ties, *e*, shrunk on, each of which is narrower than the preceding one, the outer one, *e*¹, being

of steel, the width of which should not exceed one-half inch for a one-thousand (1,000) pound wheel or roller; otherwise it would mash, mat, or conglutinate the bone instead of pulverizing it. The periphery may, furthermore, be roughened on its surface, as at *e*², or it may be divided into cogs or stampers, as at *e*³ or *e*⁴, which, while they have a stamping character, also act as grinding or pulverizing faces.

These rollers B are also furnished with a brush or scraper, C, to remove any bone-dust that may adhere to their surface.

The mill thus constructed is to be operated by the rotation of the central vertical shaft, D, through suitable gearing E, from steam or other motor.

The axes G of the rollers B pass through the shaft D, or are otherwise suitably connected therewith, in such manner that each roller is free to rise or fall in riding larger particles of bone independently of the other. Two or four of these rollers may be connected with and operated by the one vertical shaft D, or they may be operated by horse-power from the outer extremities of the axes G.

At the lower extremity of the vertical shaft D is shown the ordinary roughened cone H and concave L, for first breaking up the bone preparatory to pulverizing it.

The combined grinding and crushing action of this mill is found best adapted to the material; but it is essential that the breadth of tread of the rollers B, with relation to their weight, should not vary much from the proportion above given, although I do not intend to restrict myself precisely thereto, nor to any particular form of their periphery, the above being stated as approximates after practical test.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The roller B, composed of a central portion, *d*, and series of bands or tires *e* *e*¹, the outer one being either plain or serrated on its face, and proportioned as to width and weight, substantially as and for the purpose specified.

In testimony whereof I hereunto set my hand before two subscribing witnesses.

GEORGE PALMER.

Witnesses:

W. A. SILENCE,
W. MORRIS SMITH.