H. DUCSH.

MACHINES FOR GRINDING PHOSPHATES, BONES, &c.

No. 181,924. Patented Sept. 5, 1876.

Fig 4.

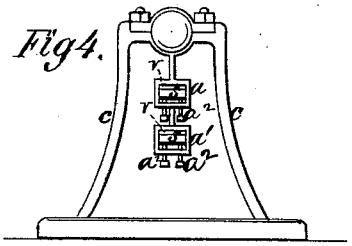


Fig 1.

Fig 3.

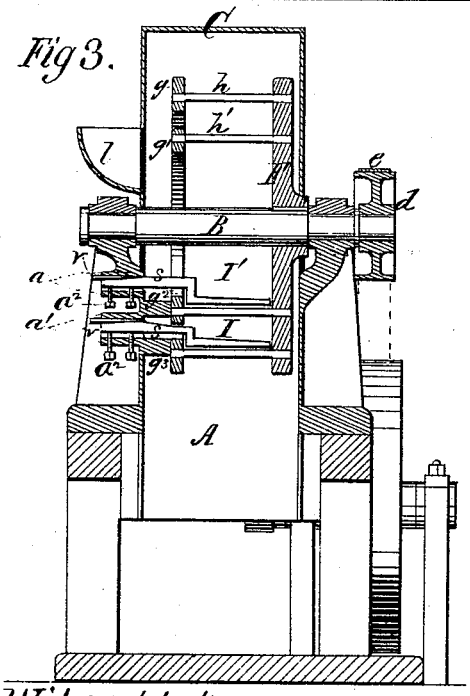
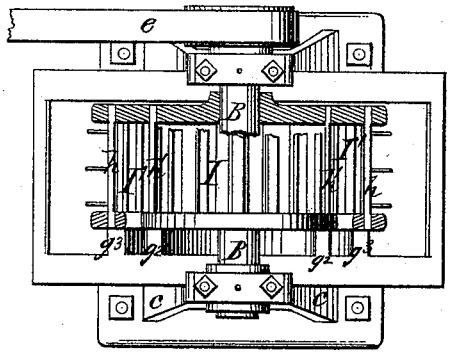


Fig 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

HENRY DUCSH, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN MACHINES FOR GRINDING PHOSPHATES, BONES, &c.

Specification forming part of Letters Patent No. **181,924**, dated September 5, 1876; application filed June 22, 1876.

To all whom it may concern:

Be it known that I, HENRY DUCSH, of Baltimore, in the county of Baltimore and State of Maryland, have invented a new and Improved Machine for Grinding Phosphates, Bones, and other material used for fertilizing purposes; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a vertical longitudinal section of my improved machine with the cap or cover of the machine in place; Fig. 2, a plan view, with the cover removed; and Fig. 3, a transverse vertical section with the cap or cover in position upon the machine. Fig. 4 is a detail view, showing the adjusting-boxes and adjusting-screws for adjusting the "breakers" in proper position within the wheel of the machine.

In the manufacture of fertilizers from the bones of animals and from shells and other calcareous matter, and fish, these substances are usually ground or comminuted, and thereafter passed through the grinding-mill in conjunction with either potash or Peruvian guano, or both together.

The nature of my invention consists in certain constructions, combinations, and arrangements of parts, as hereinafter described and specifically claimed, whereby this comminution of bone and other similar substances is more successfully accomplished than heretofore.

To enable others skilled in the art to understand my invention, I will proceed to describe it.

In the drawings, A indicates the body of the mill, having a removable cover, C, fitted to its top, as represented in Figs. 1 and 3. B is a transverse driving-shaft, supported at either end by standards *c*, and having at one end a driving-pulley, *d*, to receive upon it a driving-belt, *e*. To this shaft a solid iron disk, F, is firmly attached, while oppposite thereto are two concentric metal rings, *g* and g^1, which are firmly held in position by a series of rectangular steel bars, *h* and *h'*, which are firmly set in the rings *g* and g^1 and the disk F, as indicated in the figures. The bars *h* and *h'* are spaced a proper distance apart, and form, as it were, concentric rings, as shown clearly in Fig. 1, thus leaving an open space, I, between them, and an open space, I', between the inner series of the bars and the shaft B. It will thus be seen that the shaft B, disk F, rings *g* and g^1, and bars *h* and *h'*, together, form a breaking-wheel, having two sets of breaking-bars, arranged circularly and concentric with each other, and which revolve in the same direction when in operation.

One side of the body A of the machine is constructed with solid projections, as at g^2 and and g^3, and in circular form, to correspond with the rings *g* and g^1, and against which they nearly abut. The office of these projections is to prevent the escape of matter from the mill before it is ground, while at the same time the inner one, g^2, also serves to sustain the bones, shells, and other substances while being fed into the inner open space I' of the machine through the hopper *l* of the cover C. On one side of the body A of the machine are adjusting-boxes *a* and a^1, which communicate respectively with the open spaces I' and I of the machine. These boxes receive the outer ends of strong steel breakers *s s*, which project into the spaces I' and I, and in such manner that the lower faces of the breakers almost come in contact with the inner faces of the rectangular steel bars *h* and *h'* of the breaking-wheels. The boxes *a* and a^1 are provided with adjusting-screws a^2 through their bottoms, upon which the outer ends of the breakers *s s* rest, the breakers being held firmly in position by tightening said screws. These boxes are also of such capacity as to admit of the insertion of liners *v* between the upper part of the box and the breakers, whenever it becomes necessary to adjust the working-face of the breakers closer to the working-faces of the bars *h* and *h'* as these faces wear away. In the operation of the machine, the substance ground is delivered upon a screen beneath the body A, which permits the sufficiently finely-ground substance to pass through it, while such portion as needs to be reground is, by proper elevators, carried up and discharged into the hopper *l*, and so reground.

The operation of the machine is as follows: Bones, shells, and other substances are placed

in the hopper *l*, from whence they pass into the central opening I′, and, as the breaking-wheel revolves in one direction and at high velocity, these substances are driven by the bars *h′* violently against the breaker *s* situated in the opening I′. As the wheel revolves, such portions of the substance being ground as pass between the bars *h′* into the space I are again violently thrown by the bars *h* against the breaker *s* situated in the space I. This duplicate operation of grinding or comminuting the substance can be triplicated or quadrupled by adding to an enlarged disk, B, an additional number of circles of bars and additional breakers *s*, at the same time also triplicating or quadrupling other parts germane thereto, as described.

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

1. In combination with a revolving comminuting-wheel, consisting of a disk, having fixed thereto concentric circles of breaking-bars, adjustable breakers *s*, projecting into the spaces inclosed by said circles, as and for the purpose set forth.

2. In combination with the rings g g^1 of the comminuting-wheel, the ledges or projections g^2 g^3 upon the case of the machine.

Witness my hand in the matter of my application for a patent for an improved machine for grinding phosphates, bones, and other materials for fertilizing purposes this 19th day of June, 1876.

HENRY DUCSH.

Witnesses:
J. T. HARRIS,
C. T. DIETERLY.