D. H. Gage,

Pug Mill.

No. 19,696. Patented Mar. 23, 1858.

Fig. 2.

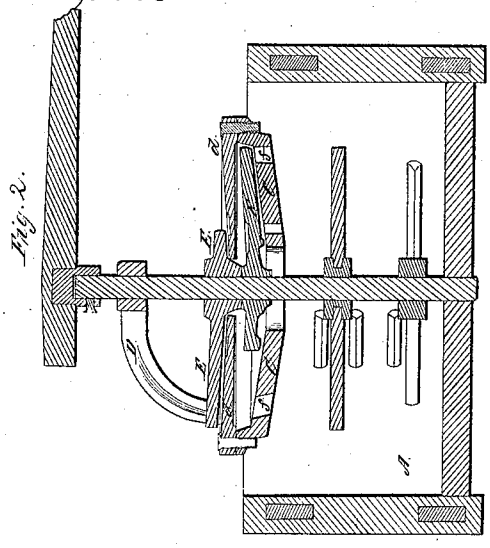

Fig. 1.

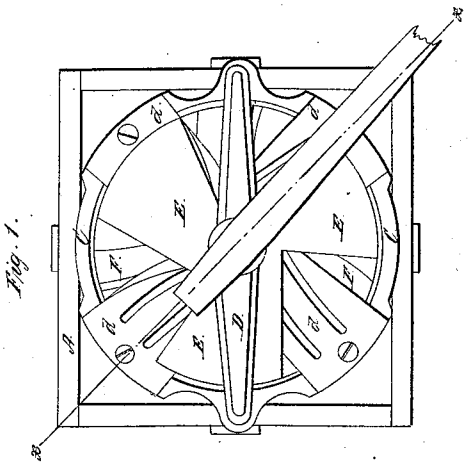

Fig. 4.

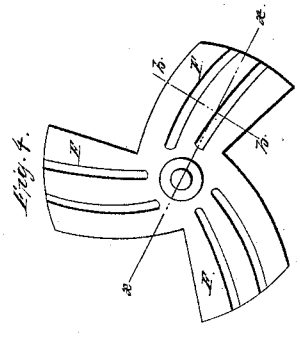

Fig. 5.

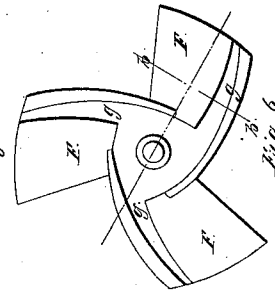

Fig. 6.

Fig. 3.

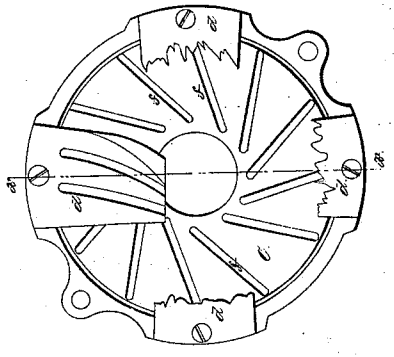

Fig. 7.

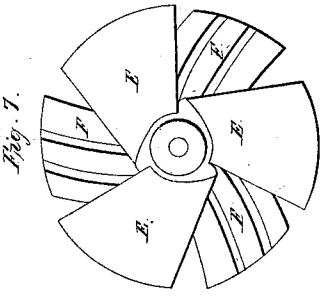

Fig. 8.

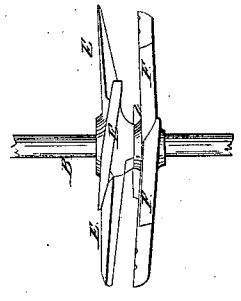

Fig. 9.

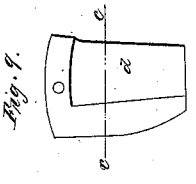

Fig. 11.

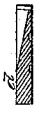

Fig. 10.

UNITED STATES PATENT OFFICE.

D. H. GAGE, OF DOVER, NEW HAMPSHIRE.

GRINDING ATTACHMENT TO PUG-MILLS.

Specification of Letters Patent No. 19,696, dated March 23, 1858.

To all whom it may concern:

Be it known that I, DAVID H. GAGE, of Dover, in the county of Strafford and State of New Hampshire, have invented a new and Improved Grinding Attachment to Pug-Mills; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, Figure 1 being a top view of said invention; Fig. 2, a vertical section in the line *x x* of Figs. 1, 3, 4, and 5; Fig. 3, a separate top view of the portion C of said attachment; Figs. 4 and 5, separate top views of the upper and lower surfaces of the grinding-arms F F of said attachment; Fig. 6, a section in the line *b b* of Fig. 4; Fig. 7, a top view of the grinding-arms E E and F F combined with the shaft B; Fig. 8, a side view of the said parts E, F, and B; Fig. 9, a separate view of one of the parts *d* of said attachment; Fig. 10, an end view of *d*, and Fig. 11 a section in the line *c c* of Fig. 9.

Similar letters indicate like parts in each drawing.

A, is the box of a pug-mill and B, the shaft thereof, which may be constructed in any well known or usual manner.

The respective movable parts E, E, and F, F, of my improved grinding attachment to pug mills, are combined with the upper portion of the shaft of said mill, and operate in combination with the stationary dish-shaped grinder C, and the arms *d*, *d*, which are combined therewith, substantially as represented in the accompanying drawings and hereinafter set forth. The said dish-shaped grinder C, is secured to the top of the chamber A, of the pug mill. The aperture in the center of said grinder is about three times the width of the shaft B, which passes through the same. Between the central aperture in C, and the rim around the outer periphery of said grinder, a series of oblique slots *f*, *f*, are cast therein, which are shown in Figs. 2 and 3. The series of inwardly projecting grinding arms *d*, *d*, are let into recesses in the flange or rim which rises from the periphery of C, and are secured therein by means of screws or other suitable devices.

A suitable hopper for the reception of the crude clay to be pulverized, must be placed over and combined with the rim of the grinder C.

The curved upper bearing D, of the shaft B, is bolted to ears which project from the rim of the grinder C.

The hub of the grinding arms E, E, is placed in such a position on the shaft B, that the said arms will work in conjunction with the upper surfaces of the arms *d*, *d*, of the grinder C. The hub of the grinding arms F, F, is placed in such a position upon the shaft B, that the said arms will work between and conjointly with the grinding arms *d*, *d*, and the bottom of the grinder C. The grinding arms E, are inclined to such a degree that as they are rotated, they will draw the clay rapidly into the grinding apparatus and they will also partially pulverize the same by the friction exerted in forcing the clay over the grooved upper surfaces of the stationary arms *d*, *d*. The said partially pulverized clay as it passes through the spaces between the arms *d*, *d*, will fall upon the arms F, F, and will be forced by said arms beneath the inclined under surfaces of the arms *d*, *d*, which action will carry the clay over the upper surfaces of the said rotating arms F, F, and cause it to fall into the grinder C, where a third pulverizing influence will be exerted thereupon by the action of the under surfaces of the arms F, F, against the slotted surface of the grinder C. The pulverized clay will be discharged into the box A, through the slots *f*, *f*, in the bottom of C, and also through the central aperture in the said grinder by means of the action of the curved flanges which form the grooves *g*, *g*, in the under surfaces of the arms F, F. Were the slots *f*, *f*, in the bottom of C, the only eduction apertures therefrom, there would be a constant liability to clog the grinding apparatus, unless the shape of the grinding arms E, E, should be such that they would have but a slight tendency to draw the clay into said apparatus; but the curved flanges on the under surfaces of the arms F, F, acting in conjunction with the large central aperture in C, prevents the possibility of clogging my improved pulverizing apparatus, no matter how rapidly the clay may be drawn into the same from the hopper.

The pug mill with which my improved pulverizing apparatus is combined may be

constructed in any suitable or usual manner.

Having thus fully described my improved grinding attachment to pug mills, what I claim therein as my invention and desire to secure by Letters Patent, is—

The combination of the double series of rotating arms E, E, and F, F, with the stationary arms *d*, *d*, and the dish-shaped grinder C, when the said parts are so shaped and arranged as to operate in conjunction with each other substantially as herein set forth.

The above specification of my improved grinding attachment to pug-mills signed this ninth day of January, 1858.

DAVID H. GAGE.

Witnesses:

SAML. M. WHEELER,
CHARLES T. MACY.