

No. 852,173.

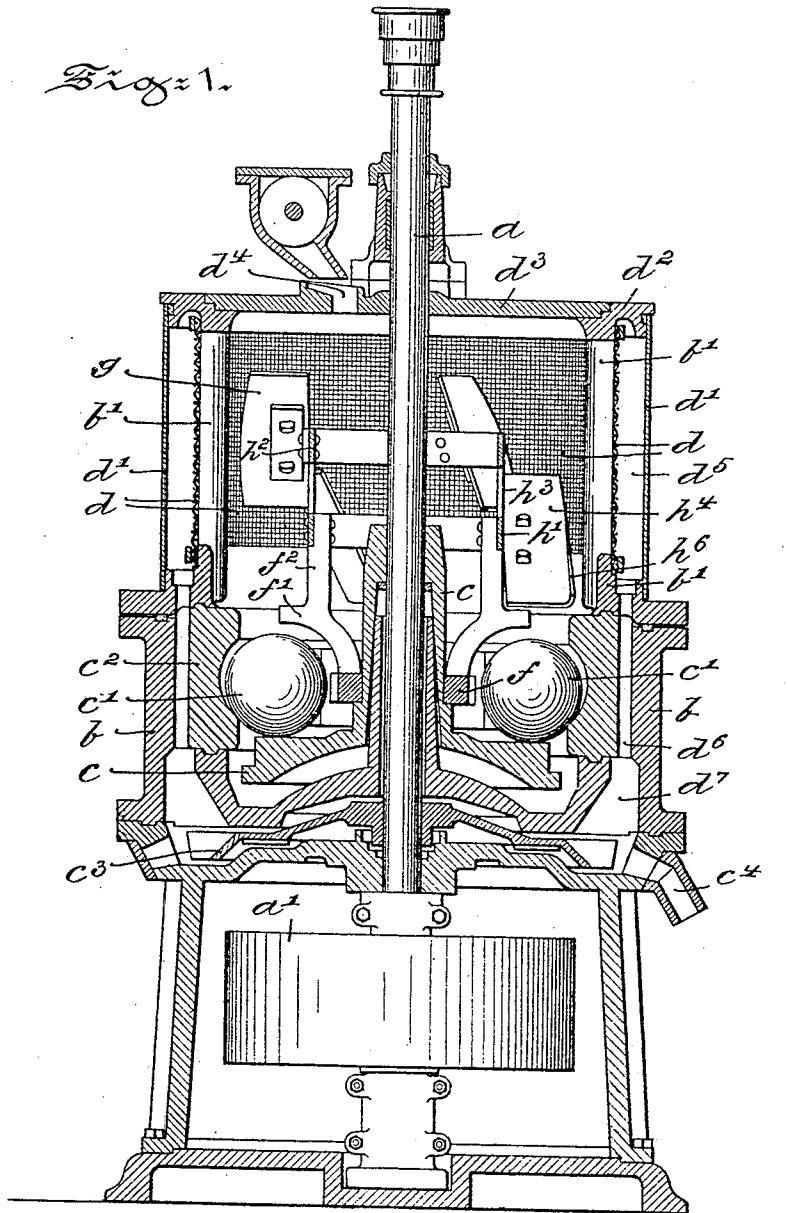
PATENTED APR. 30, 1907.

J. W. FULLER, JR.
PULVERIZING OR GRINDING MILL.

APPLICATION FILED JAN. 6, 1906.

2 SHEETS—SHEET 1.

Fig. 1.



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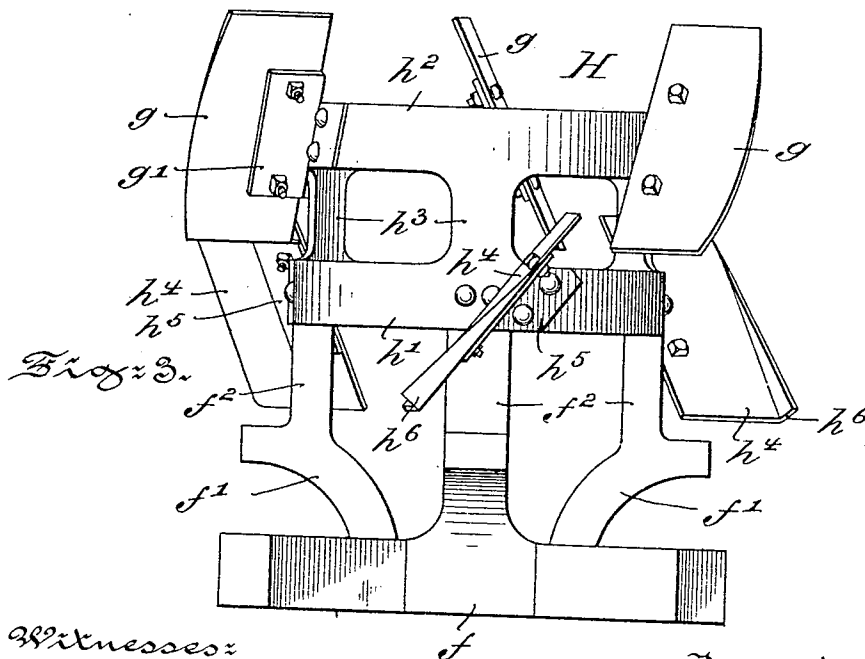
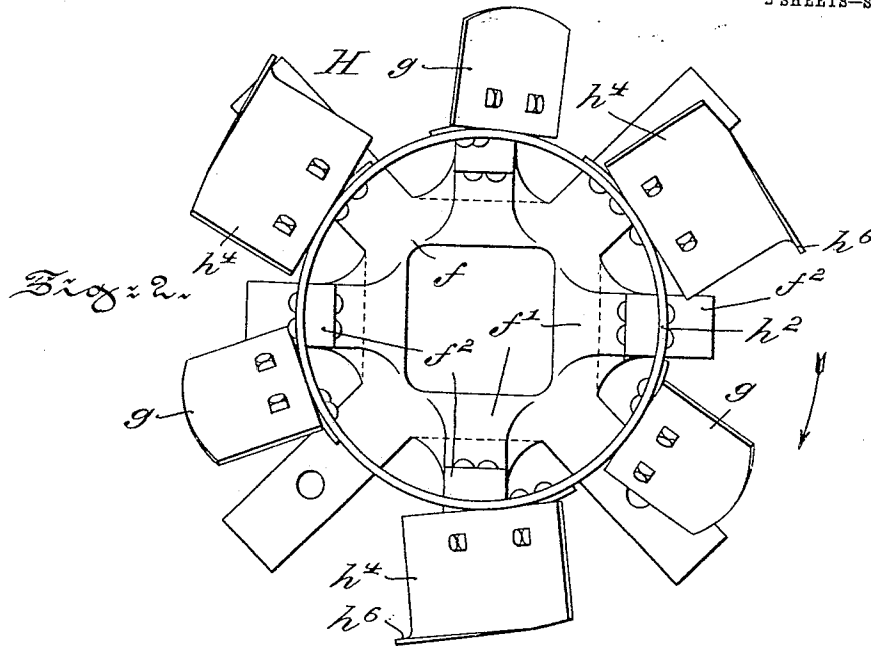
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JAMES W. FULLER, JR., OF CATASAUQUA, PENNSYLVANIA.

PULVERIZING OR GRINDING MILL.

No. 852,173.

Specification of Letters Patent.

Patented April 30, 1907.

Application filed January 5, 1906. Serial No. 294,683.

To all whom it may concern:

Be it known that I, JAMES W. FULLER, JR., a citizen of the United States, residing at Catasauqua, in the county of Lehigh and State of Pennsylvania, have invented certain new and useful Improvements in Pulverizing or Grinding Mills, of which the following is a specification.

My invention has relation in a pulverizing or grinding mill to means for elevating and fanning of matter through the screen of the mill to separate the coarse matter from the fine matter such as cement, coal, culm, clinker or other materials for various uses; and in such connection it relates to the constructive arrangement of said means for the defined purpose.

The principal objects of my invention are first, to provide a pulverizing or grinding mill with two series of obliquely arranged wings or blades located above each other and adapted when actuated to elevate matter from the grinding means and deflect the same toward a screen to permit of the discharge thereof through the same; second, to provide the lower series of wings or blades with flanges which in conjunction with the blades or wings are adapted to collect and conduct coarser matter, not passing through the screen of the mill and descending by gravity, back into the path of the grinding means of the mill; third, to arrange the lower series of blades or wings so that they are maintained in operative position in proximity to the grinding means of the mill to remove matter accumulating on certain portions of the grinding means back into the path of such means; and fourth, to provide a support for the blades or wings to permit of free circulation of air between the same and of the passage of matter to be ground introduced from the upper portion of the mill into the path of the grinding means.

The nature and scope of my present invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof, in which

Figure 1, is a view partly in vertical central section and partly in elevation of a pulverizing or grinding mill containing a fanning means embodying the particular main features of my said invention. Fig: 2, is a top or plan view enlarged, of the fanning means and support thereof removed from the mill;

and Fig: 3, is a front elevational view of said fanning means.

Referring to the drawings *a*, represents the driving shaft arranged vertically in the mill. *a*¹, is a driving pulley for the said shaft. Within the casing *b*, traversed by the shaft *a*, is arranged an annulus or grinding ring *c*². To the shaft *a*, is suitably secured a frame or carrier *c*, for the grinding balls *c*¹, and a disk-like platform *c*³, upon which the fine particles from the mill are collected, after separation, and prior to discharge through a spout or outlet *c*⁴. Upon the casing *b*, is arranged a frame *b*¹, adapted to support a screen *d*, and a casing *d*¹. The frame is closed at its upper end by a ring *d*², and a plate *d*³, removably secured thereto. In the plate *d*³, is provided an opening *d*⁴, adapted to permit of the entrance of matter to be ground into the mill. To the carrier *c*, for the grinding balls *c*¹, is removably secured a frame *f*, provided with outwardly and upwardly flaring arms *f*¹, serving to hold the balls *c*¹, in position upon the carrier *c*. To the extension *f*², of the arms *f*¹, is secured an annular skeleton body or support *H*, consisting of two rings *h*¹ and *h*², connected with each other by strips or bands *h*³. To the lower ring *h*¹, at suitable distances apart are rigidly secured by means of brackets *h*⁵, obliquely arranged wings or blades *h*⁴, provided with laterally projecting flanges *h*⁶, preferably triangular in outline.

As shown in Fig: 1, the wings or blades *h*⁴, are held by the ring *h*¹, in a position, in which the same project a certain distance over the ring *c*², and are held with their flanges *h*⁶, in alinement with the inner upper surface of the grinding ring and in proximity thereto, for a purpose to be hereinafter more fully explained. To the upper ring *h*², are secured at certain distances apart by means of brackets *g*¹, obliquely disposed blades or wings *g*, occupying a position intermediate of the blades or wings *h*⁴, and overlapping the same. When the respective series of wings or blades *h*⁴ and *g*, are rotated in the direction indicated by the arrow in Fig: 2, the lower wings or blades *h*⁴, owing to their different angular positions with respect to the upper wings or blades *g*, will by producing a current of air tend to continually elevate matter away from the grinding ring or annulus *c*², and balls *c*¹, into the upper portion of the mill into the path of the wings or blades *g*, which deflect the same as well as the current of air

against the screen d , to cause the particles of matter of certain degrees of fineness to be forced into a chamber d^5 , formed by the screen d , and casing d^1 , and this matter to
 5 then descend by gravity through passages d^6 , into a chamber d^7 , from which the matter is removed through the spout c^4 , by means of the rotatable platform c^3 . The coarser particles of matter which are raised
 10 by the rotation of the wings or blades h^4 , and forced by the wings or blades g , against the screen d , will by being prevented a passage through the screen d , descend by gravity and be brought into intimate contact with the
 15 lower series of wings or blades h^4 , and by them directly delivered into the path of the active parts of the grinding ring c^2 , and balls c^1 , by the flanges h^6 , which confines the matter against centrifugal action upon the blades
 20 h^4 . Certain of the particles of matter accumulating on the upper surface of the grinding ring c^2 , will also be swept from this ring by the flanges h^6 , of the lower series of wings or blades h^4 , which by tending to force the current
 25 of air upward parallel to the walls of the frame b^1 , will remove the particles from the ring c^2 , into the path of the grinding surface of the ring c^2 , and balls c^1 .

The annular skeleton body or support H, due to its constructive arrangement will divide the chamber formed by the frame b^1 , ring d^2 , and cover plate d^3 , into two concentric sections, in the outer of which move the blades or wings h^4 and g , and in the inner of
 35 which free from any obstruction, feed through the inlet d^4 , descending matter to be ground to the grinding means of the mill as well as a portion of the current of air raised in the outer section by the lower series of wings h^4 , and deflected into the chamber
 40 d^5 , by the upper series of wings g . These wings or blades g , by rotating are prevented by the annular support H, from greatly affecting the matter descending in the inner
 45 central section formed by the same as well as the slight current of air which has escaped the action of the wings or blades g , and which by abutting against the cover plate d^3 , of the frame b^1 , will be deflected by the same into
 50 the inner section. The influence of the rotating wings or blades g , however, is sufficient to draw finely divided matter descending into the inner section directly into the outer section of the chamber formed by the
 55 frame b^1 , and support H, from which it is conducted by the wings or blades g , through the screen d , into the chamber d^5 . The coarser particles of the descending matter owing to their weight and in the absence of
 60 any obstruction, will not be sufficiently influenced as to be drawn into the outer section

of the frame b^1 , nevertheless, the same will be deflected sufficiently in a radial direction to descend in an oblique course which leads the matter to the grinding ring c^2 . In this
 65 movement, the matter will be assisted by the grinding balls c^1 , producing a current of air, which will be directed against the ring c^2 .

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

1. In a pulverizing or grinding mill, a casing, a frame provided with a surrounding screen forming a central chamber, said casing and screen covered frame forming an
 75 outer chamber leading directly to discharge ducts of the mill, rings supported within said screen covered frame, said rings provided with two series of wings or blades obliquely arranged in respect to said rings, the blades
 80 or wings of one series occupying a position intermediate of the blades or wings of the other series and the arrangement being such as to elevate matter from the grinding means of the mill into said central chamber to force
 85 thereby finely ground material from said grinding means through the screen of said frame into said outer chamber and therefrom into said discharge ducts and to permit the coarser or partially ground material to
 90 fall by gravity back into the path of the grinding means of said mill.

2. In a pulverizing or grinding mill, a casing, a grinding ring arranged in said casing, a frame having openings carried by said casing, a screen surrounding said frame, said
 95 casing and frame forming a central chamber, a shaft, a carrier mounted on said shaft, arms supported by said carrier, rings carried by said arms, wings or blades carried by said
 100 rings, grinding balls supported by said carrier and held by the same opposite said grinding ring, said shaft, when rotated, adapted to actuate said carrier and by the same to rotate said balls within said ring to grind
 105 material fed thereto, said arms and rings arranged to form a skeleton frame within said central chamber and adapted to permit of free descent of material to be ground through said rings and between said arms,
 110 and said wings or blades, when rotated, adapted to elevate ground material from said balls and ring and force the same through the screen of said frame.

In testimony whereof, I have hereunto set my signature in the presence of two subscribing witnesses.

JAMES W. FULLER, JR.

Witnesses:

A. J. KOPP,
 GEORGE KOPP.