No. 849,782. PATENTED APR. 9, 1907.

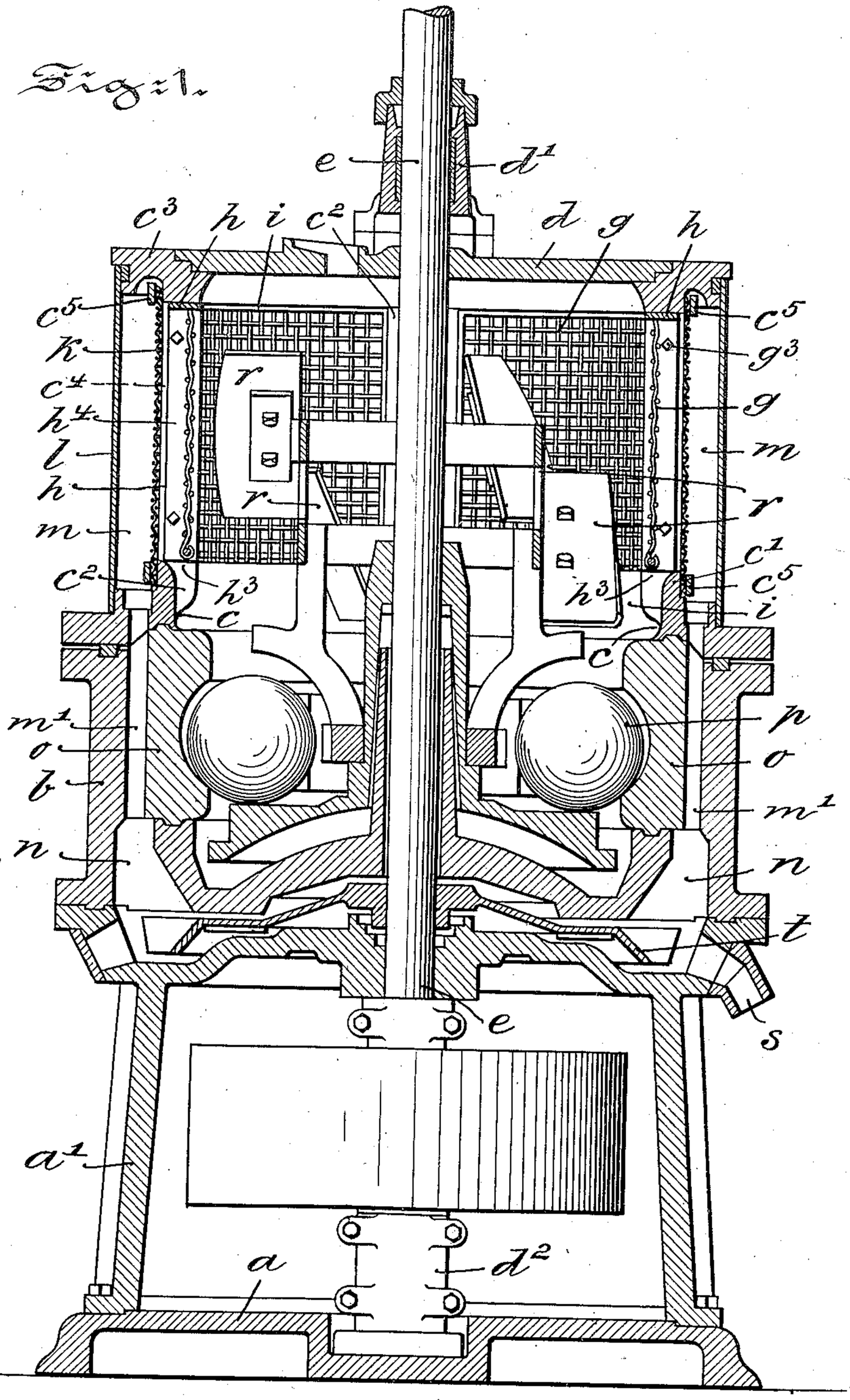
J. W. FULLER, JR.

PULVERIZING OR GRINDING MILL.

APPLICATION FILED MAR. 13, 1906.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

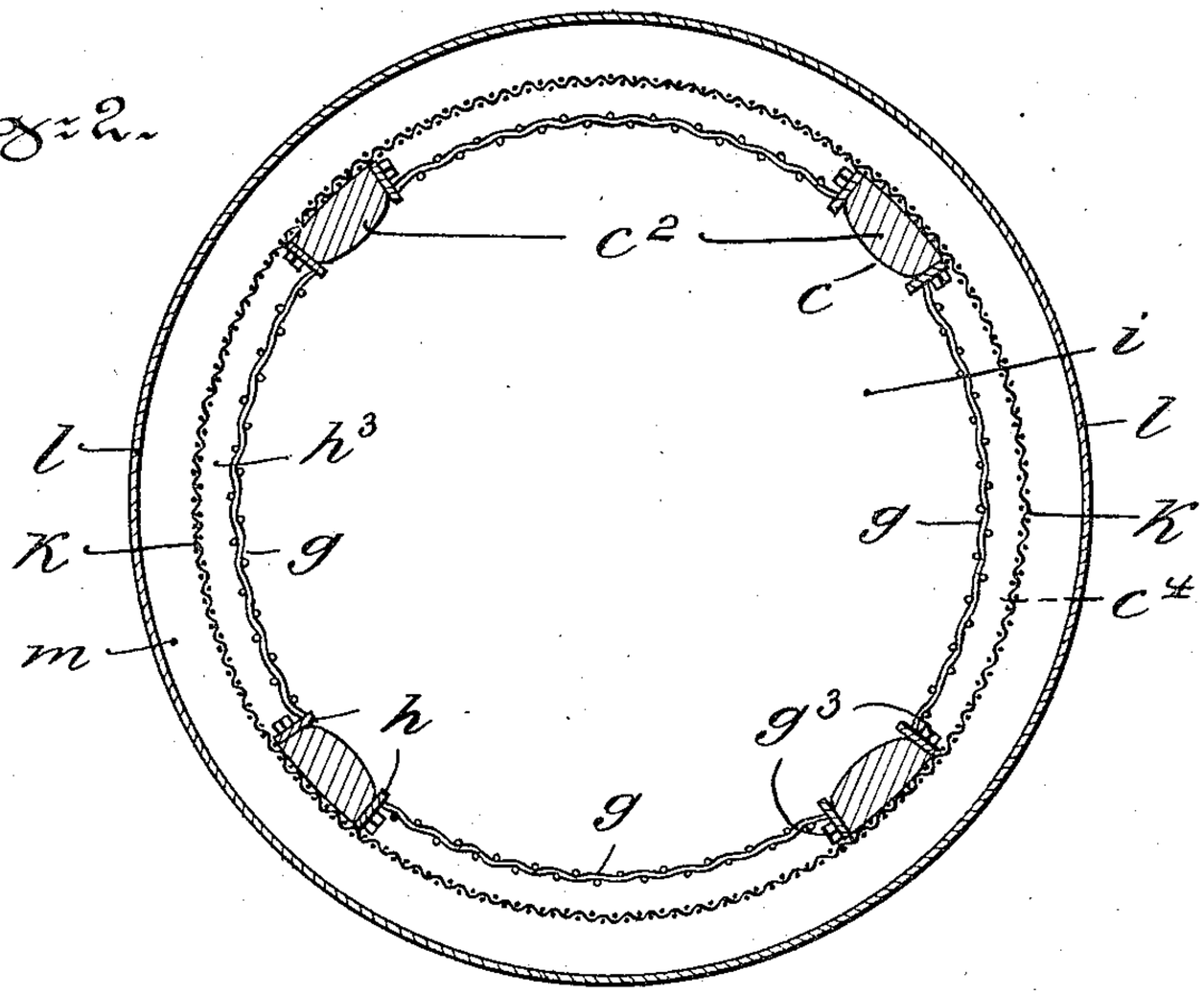


Fig. 3.

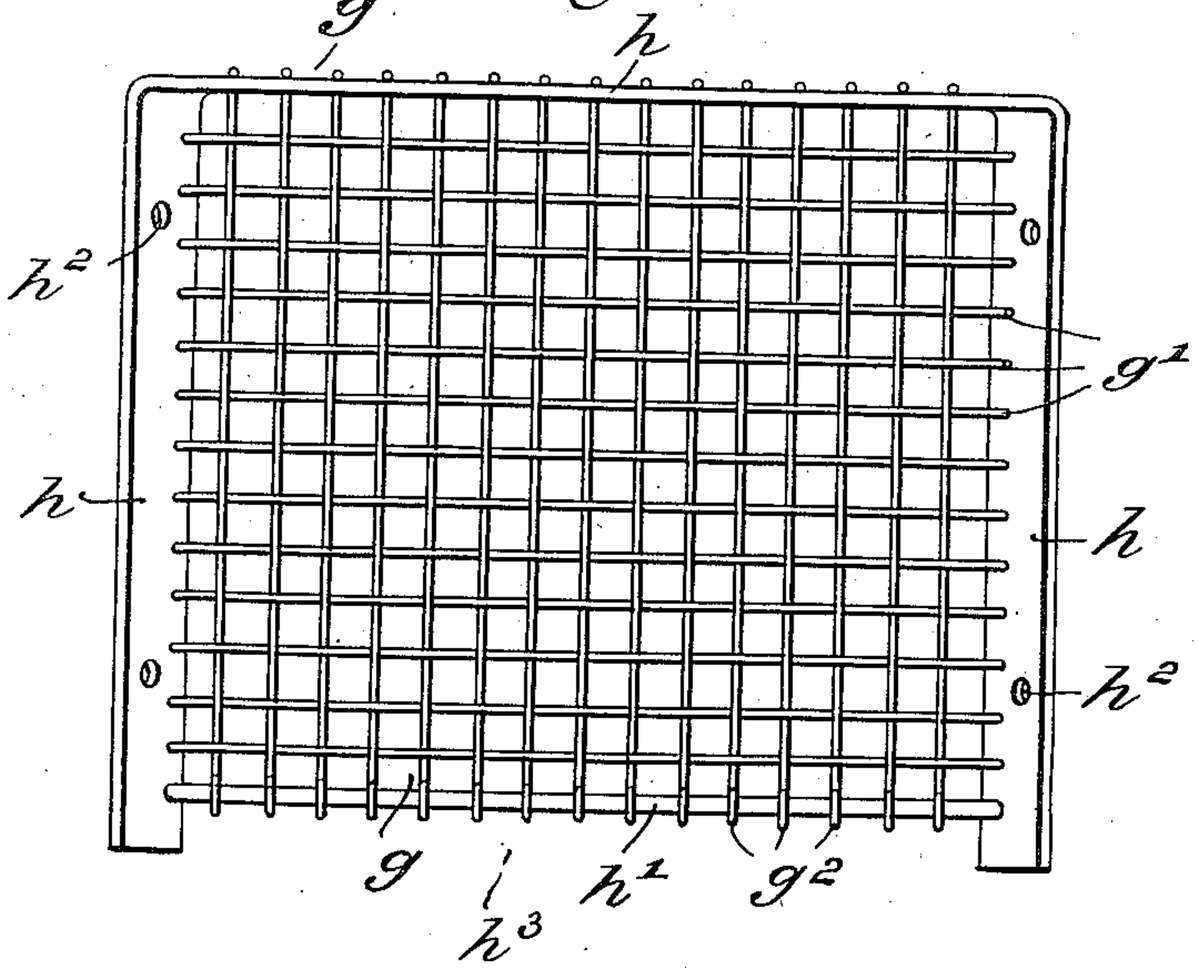
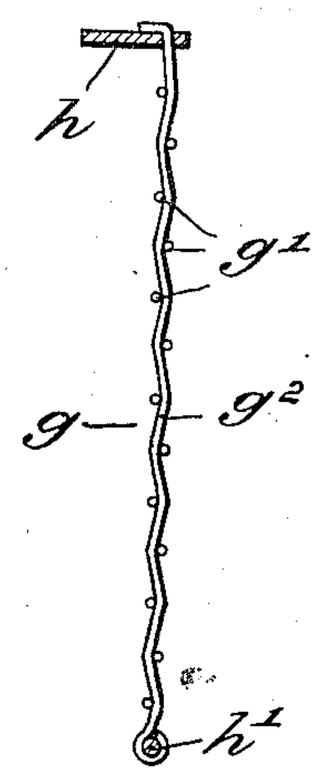


Fig. 4.



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UNITED STATES PATENT OFFICE.

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

PULVERIZING OR GRINDING MILL.

No. 849,782. Specification of Letters Patent. Patented April 9, 1907.

Application filed March 13, 1906. Serial No. 305,743.

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 to a pulverizing or grinding mill, and in such connection it relates particularly to the construction and arrangement of the mill for permitting fine-ground material to be discharged from the mill and protecting certain material separating parts of the mill from the direct impact of material to be bolted.

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 illustrating partly in vertical central section and partly in elevation a pulverizing or grinding mill and also showing the arrangement of the finishing and protecting screens therein, the manner of securing the screens to the mill, the space or chamber formed between the screens, and the outlet for the same to permit coarse material retained by the outer finishing-screen to pass back into contact with the grinding mechanism of the mill, all embodying characteristic main features of my said invention. Fig. 2 is a horizontal sectional view of the upper portion of the mill, certain parts being removed therefrom and illustrating the arrangement of the finishing and protecting screens, the division of the protecting-screen into sections, and the manner of connecting the screen-sections to posts formed in the upper portion of the casing of the mill. Fig. 3 is a detail view, enlarged, illustrating in elevation one of the sections of the protecting-screen, a frame and a bar surrounding the same, and the manner of forming an opening at the lower portion of the screen-section; and Fig. 4 is a vertical sectional view of the screen-section shown in Fig. 3 and also illustrating the manner of connecting the vertical screen members to the frame and to a rod carried by the same.

Referring to the drawings, *a* represents the bed-plate of the pulverizing or grinding mill, to which is secured a standard *a'*, supporting a sectional casing *b*. The casing serves to support a casing or housing *c*, which is formed by an annular base portion *c'*, connected by posts c^2 with an annular head portion c^3. The head portion c^3 is closed by a removable plate *d*, carrying the upper bearing *d'* for a driving-shaft *e*, the lower bearing d^2 of which is carried by the base-plate *a*. The base and head portions *c'* and c^3 of the casing *c*, in conjunction with the posts c^2, preferably formed integral therewith, form a series of openings c^4, which are closed by sections of coarse-meshed strong wire screens *g*, held in position flush with the inner surface of the posts c^2 by the following preferred mechanism.

As shown in Fig. 3, the sections of the screens *g* are surrounded at both sides and at the upper portion by an inverted-U-shaped frame *h*, consisting of a flat strip of metal, which at a certain distance above its free ends is provided with a bar or rod *h'*. The horizontal strands *g'* of the wire of the screen *g* are secured to the sides of the frame *h* adjacent to the inner edge thereof, while the vertical strands of the wire g^2 are similarly secured to the upper portion of the frame *h* and rod *h'*. When the frame *h* with the screen *g* mounted therein is inserted in one of the openings c^4, formed in the casing *c*, the same fits closely therein and permits of a ready connection with the posts c^2 by bolts or screws g^3, passing through openings h^2, arranged in the sides of the frame *h*. The screen *g*, not extending to the lower end of the frame *h*, forms, in conjunction with the rod *h'* and the respective base portions *c'* of the casing *c*, an oblong opening h^3, which communicates with the interior chamber *i*, formed by the casing *c* and screens *g*, closing the openings c^4. The screens *g* serve as protecting means for a fine-meshed wire screen *k*, which surrounds the exterior of the casing *c* and is connected therewith beyond the openings c^4 preferably by bands c^5, clamping the upper and lower ends thereof to the casing *c*. This screen *k* in conjunction with the screens *g* form a chamber h^4 in each of the openings c^4 of the casing *c*, which by means of the outlet h^3 are in open communication with the chamber *i* for a purpose to be presently more fully explained. A certain distance beyond the screen *k* the casing *c* is surrounded by a casing *l*, preferably formed of sheet metal, which forms an outer annular chamber *m*, commu-

nicating by ducts m' with a chamber n, arranged in the bottom of the casing b. When the material ground in the mill by the intervention of a grinding ring or annulus o and by rolls or balls p, traveling within the same, is raised or elevated in the chamber i by the rotation of obliquely-arranged wings or vanes r, the same is forcibly thrown against the inner screens g. These screens, although permitting of the ready passage of the material therethrough, nevertheless take up and neutralize the force of the impact, so that the material which has to cross the chamber h^4 in order to reach the screen k strikes this screen with considerably less force than would be the case were the screens g and k placed side by side. The material of sufficient fineness is forced through the meshes of the screen k by the current of air generated in the chamber i through the intervention of the wings or vanes r, while the material of less fineness, not passing the screen k, descends in the chamber h^4, and from thence it is conducted through the outlet h^3 directly into the part of the grinding-surface of the ring o and between the same and grinding-balls p for further grinding thereof. The material passing the finishing-screen k and entering the collecting-chamber m is conducted by the ducts m' into the chamber n, from which the same is discharged through a spout s by the intervention of a revolving platform t, as shown in Fig. 1.

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

The combination, in a pulverizing or grinding mill, of a grinding-ring, balls operatively engaging and maintained in contact with said ring, a housing provided with openings, a fine screen and sectional coarse screens, said fine screen surrounding said housing, and said sectional coarse screens fitting the openings of said housing and two series of rotatable wings or blades supported above said grinding means at different angles to each other and so arranged as to elevate materials of different degrees of fineness from said grinding means and by the upper series of said blades or wings to discharge by the force of said wings or blades through said screens, substantially as and for the purposes described.

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

JAMES W. FULLER, Jr.

Witnesses:

A. N. Ulrich,

Bessie McMahon.