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H. F. KLEINFELDT

1,521,891

GRINDING MILL

Filed April 12, 1922

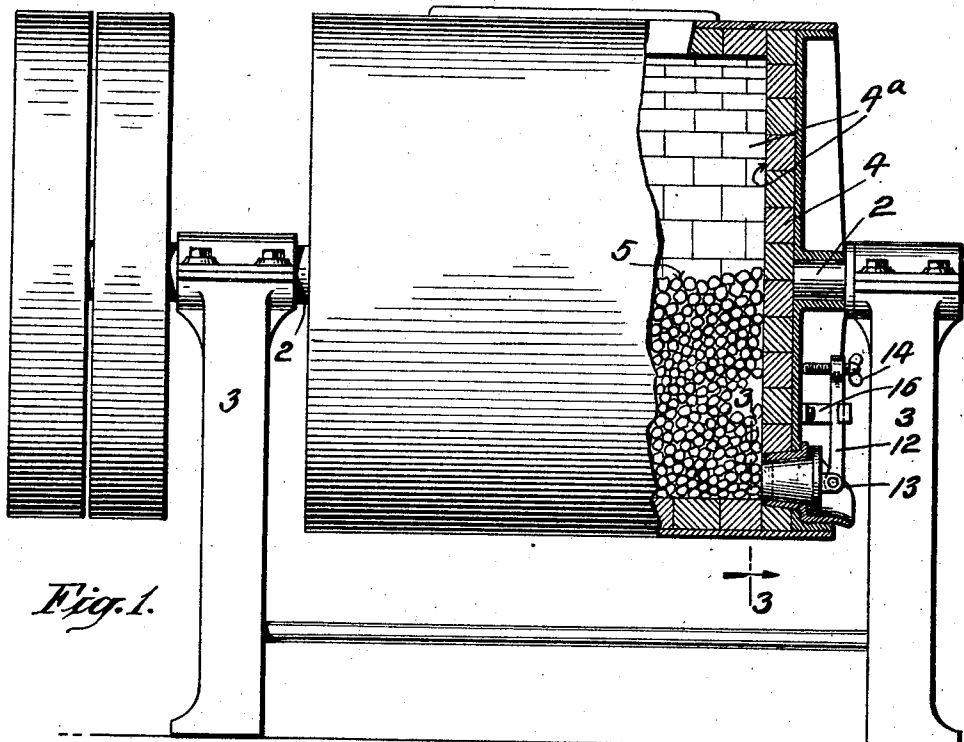


Fig. 1.

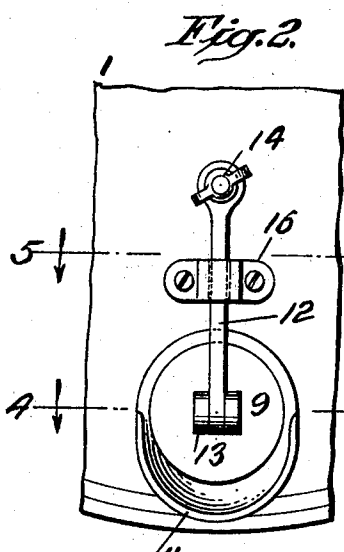


Fig. 2.

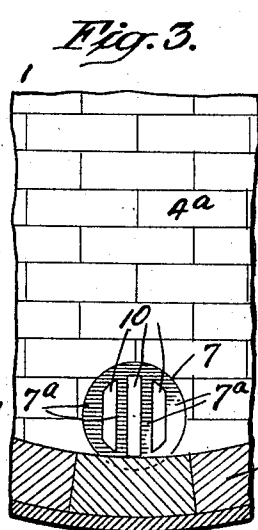


Fig. 3.

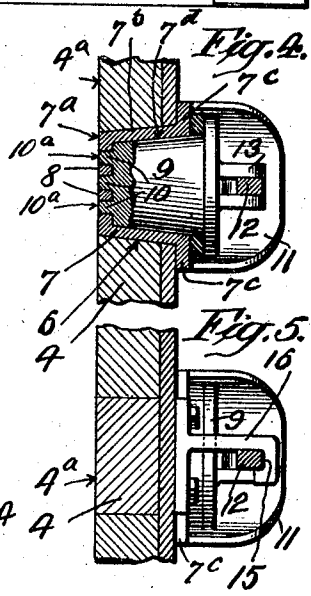


Fig. 4.

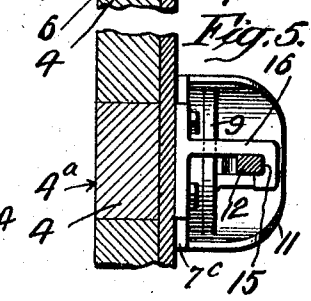


Fig. 5.

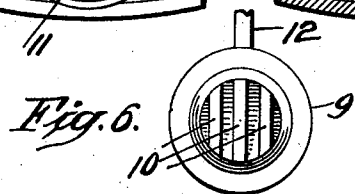


Fig. 6.

INVENTOR
HENRY F. KLEINFELDT
BY
John H. Smith
ATTORNEY

UNITED STATES PATENT OFFICE.

HENRY F. KLEINFELDT, OF NEWARK, NEW JERSEY.

GRINDING MILL.

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To all whom it may concern:

Be it known that I, HENRY F. KLEINFELDT, a citizen of the United States, and a resident of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Grinding Mills, of which the following is a specification.

This invention relates to improvements in grinding mills.

The principal objects of this invention are to produce a grinding mill for wet or semi-liquid products from which the contents may be removed through a drain aperture without the removal of the grinding elements, such as pebbles or balls, within the same and without the formation on the inner surface of pockets, indentations or crevices, or otherwise detracting from the surface flushness of the drum lining, so that an efficient grinding to an equal degree of an entire charge of paint or like products may be effected by the grinding elements, and the congregation or the aggregation of raw material within such pockets which remains unground until the discharge of the load is avoided; to provide a drain opening (preferably at one end and near the periphery of a cylindrical drum) which is partially closed by a strainer set in flush with the surface of the lining and having an aperture or apertures adapted to permit a straining of the wet, liquid or semi-liquid contents, while retaining the grinding elements within the drum, and a plug seated within said strainer and having projections on its inner edge adapted to register closely with the apertures in the strainer and to extend through the same a sufficient distance to form with the inner surface of the strainer and the lining of the wall an interior surface which will be flush and without pockets, crevices or other indentations in which material may lodge and remain unground.

With these and other objects in view, the invention comprises the combination of members and arrangement of parts so combined as to co-act and cooperate with each other in the performance of the functions and the accomplishment of the results herein contemplated, and comprises in one of its adaptations the species or preferred form

illustrated in the accompanying drawings, in which—

Fig. 1 is a side elevation partly in section of a pebble mill embodying my invention;

Fig. 2 is a fragmentary view showing that portion of one end of the pebble mill illustrated in Fig. 1, which is provided with a drain aperture;

Fig. 3 is a section on the line 3—3 of Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 2 looking in the direction of the arrow;

Fig. 5 is a section on the line 5—5 of Fig. 2; and

Fig. 6 is a top fragmentary view of the plug viewed from the inner end.

Referring now to these drawings, 1 indicates the drum of a grinding mill which is, as shown, cylindrical in conformation and is supported by shafts 2 suitably connected to the opposite ends or heads of the cylinder and supported on standards 3. The said cylinder is provided with a lining 4 composed of blocks of porcelain or other suitable material and contains the usual grinding elements, such as balls or pebbles 5.

In grinding paint and like products in a mill of this character it is necessary, in order efficiently to grind the same in the mill, to have the inner surfaces of each of the circumferential and end walls of the cylinder lining substantially flush and free from pockets, crevices or indentations in which small portions of the material may lodge and remain unground, so that all the paint or similar product which is being ground in one operation will be operated on with an equal degree of grinding or manipulation by the grinding elements, and for this reason it was heretofore considered desirable to avoid all drain openings in such cylinders.

By the use of my invention, I am enabled to provide means which will be effective to permit a draining of the ground products, a straining thereof which will prevent the exit from the cylinder of grinding elements and at the same time maintain an inner surface which will be flush with the lining 4. Such means comprises the provision, preferably in one of the end walls or heads of the cylinder and close to the

periphery thereof. of a drain opening 6 of any suitable size, in which is seated a strainer or grating 7 set into the said opening so that its inner surface 7^a will be flush with the inner surface 4^a of the lining 4 and this grating or strainer, as shown, comprises a cylindrical cup-shaped portion 7^b having a depressed plug seat 7^a and flanges 7^c abutting against the outer end or head plates of the mill cylinder. Said cup-shaped portion 7^b extends inwardly through the opening 6 so that its inner surface 7^a will be flush with the inner surface 4^a of the lining 4. The strainer shown is provided at its inner surface with bars 8 spaced to produce strainer openings of less width than the diameter of the grinding elements employed in the mill. These strainer openings are closed by a plug 9 which seats in the plug seat 7^b to close or fill up same and also has, on its inner surface, projections 10 adapted to fit into and register with the strainer openings of the strainer. These projections 10 are of a size and length sufficient to extend through such strainer openings and produce an inner flat surface 10^a flush with the inner surface of the strainer bars. The inner surfaces of such projections, strainer and lining will thus be entirely flush and no pockets, crevices or indentations on the inner lining wall of the cylinder will be formed in which small portions of the material may lodge and remain unground.

As illustrated, a guiding lip 11 is provided at the outer side of the strainer and this guiding lip is formed integrally with the grating 7.

Suitable means for handling the plug 9 and for maintaining and securely locking the same on its seat is provided and, as illustrated, said plug has connected thereto a rod or arm 12 which is pivoted in axially-disposed knuckles 13 on the plug and is provided at its opposite end with a thumb screw 14. This arm 12 is adapted to fit into a notch 15 in a bearing bracket 16 mounted on the exterior of the end or head of the cylinder intermediate the ends of the arm

12, so that when the arm is seated in its said notch a screwing of the thumb screw 14 downwardly or inwardly in relation to the arm 12 will force the outer end of the arm upwardly and will, owing to the fact that the said arm 12 abuts intermediate its ends on the bearing bracket 16 which forms a fulcrum therefor, cause the opposite pivoted end of the arm, which is attached to the plug, to be forced inwardly so as to press the plug into its seat and lock the same therein.

Having described my invention, I claim:—

1. In a grinding mill, a drum having a drain opening, a strainer provided with a plurality of strainer openings fitted within said drain opening and having its inner surface flush with the inner surface of said drum, and a plug having a plurality of projections of a size and number corresponding to and registering with the said strainer openings and of a length sufficient to cause the inner surface thereof to be flush with the inner surface of the strainer.

2. In a grinding mill, a drum comprising an outer shell and a lining of suitable material within said shell, said drum having a drain opening extending through said shell and lining, a strainer comprising a cup-shaped member seated in said drain opening and extending from the outer shell through the lining and provided with a depressed plug seat and strainer bars, the inner surface of which is flush with the surface of the lining, and a plug having a body portion seated in the plug seat of the strainer and having projections of a size equal to the said strainer openings and of a length sufficient to cause the inner surface thereof to be flush with the inner surface of the strainer.

In witness whereof, I have signed my name to the foregoing specification in the presence of two subscribing witnesses.

HENRY F. KLEINFELDT.

Witnesses:

JOSEPH F. O'BRIEN,
HELEN V. WHIDDEN.