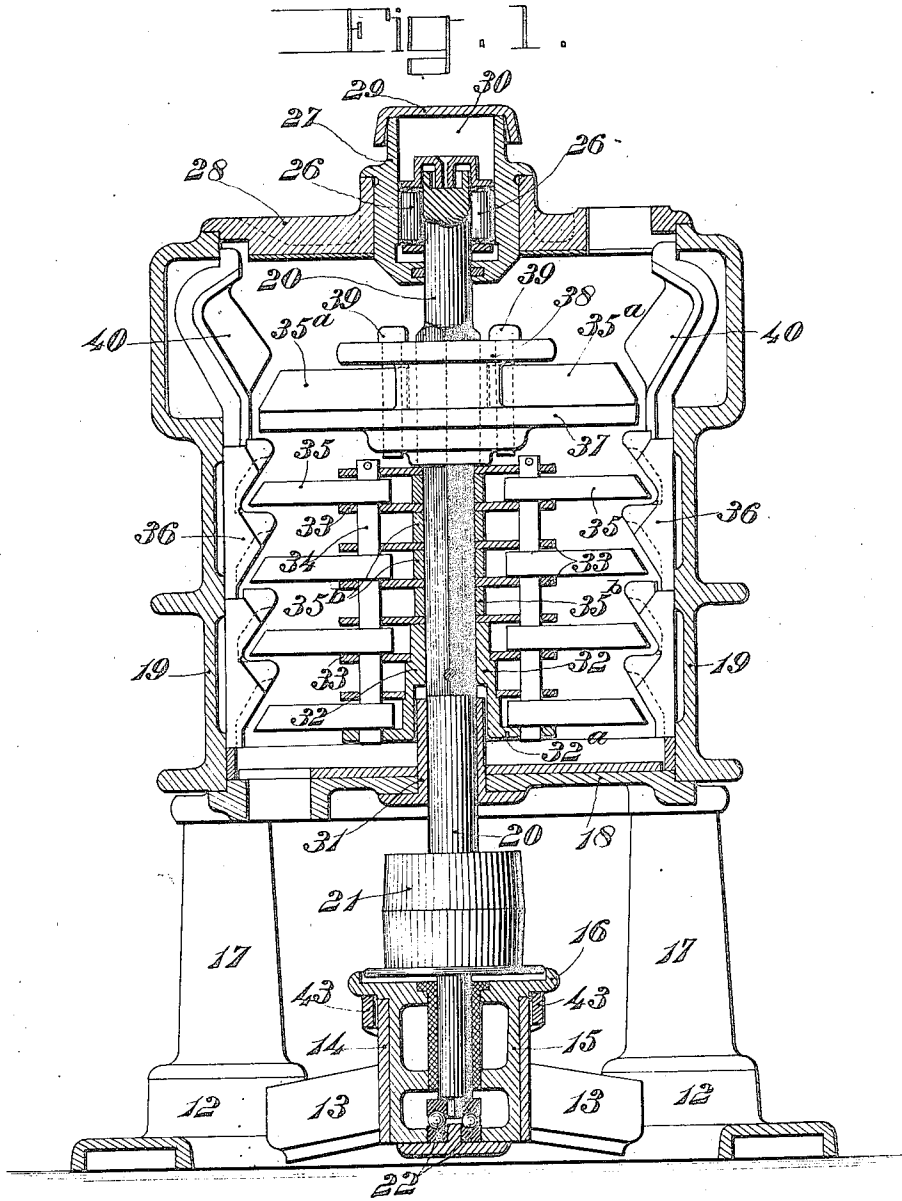


T. L. STURTEVANT.
 ROTARY BEATER MILL.
 APPLICATION FILED JULY 27, 1916.

Patented Jan. 16, 1917.
 3 SHEETS—SHEET 1.

1,212,419.



Witness:

Harry King

Inventor:

Thomas L. Sturtevant

By *Calvin Watson*

Attorney

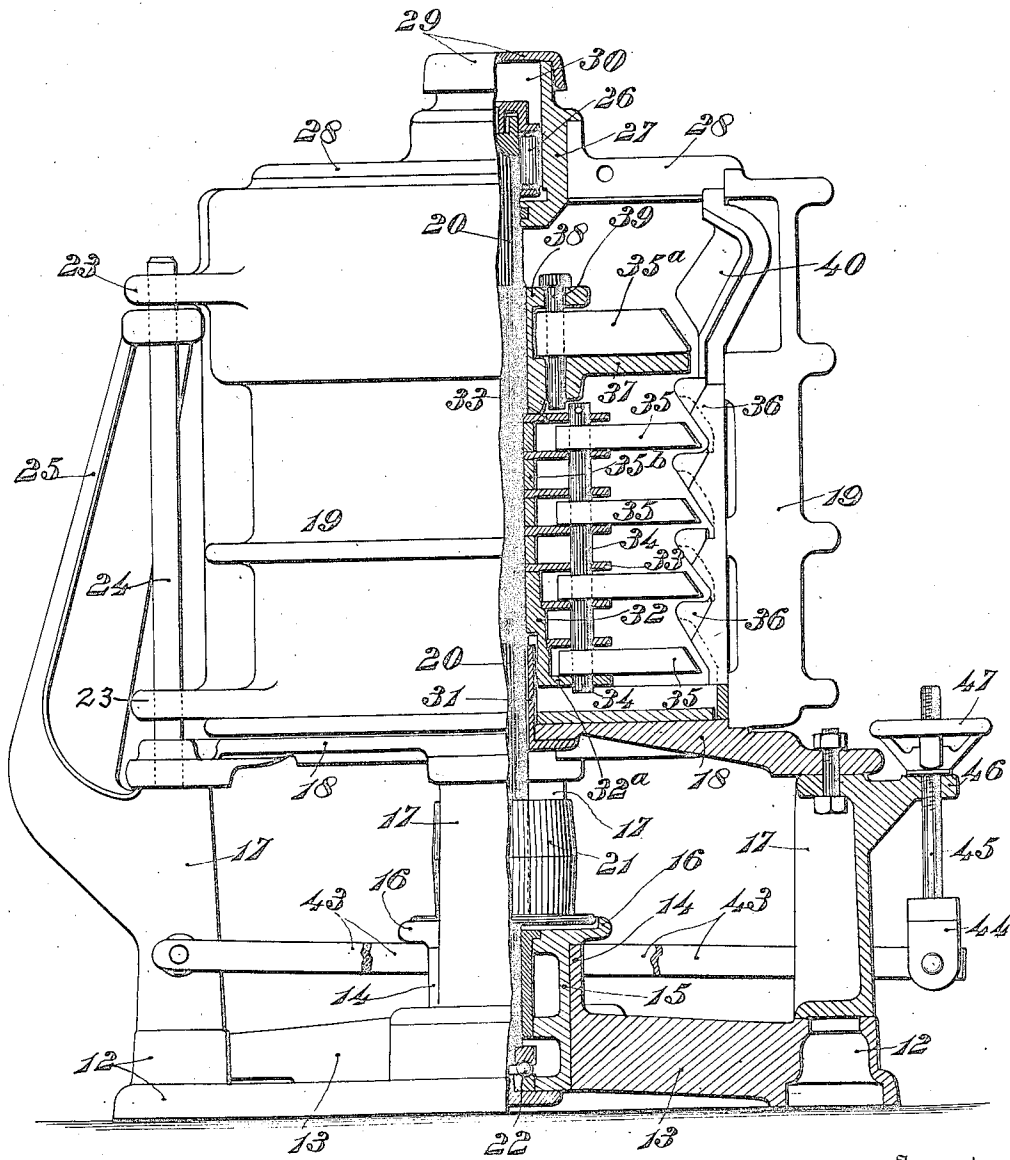
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3 SHEETS—SHEET 2.

Fig. 2.



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Fig. 3.

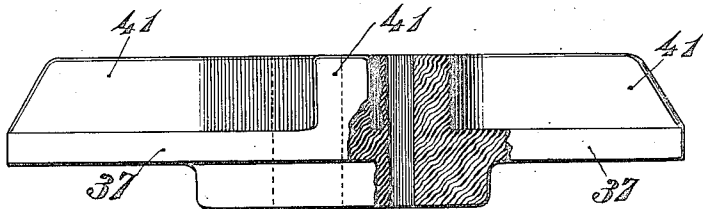
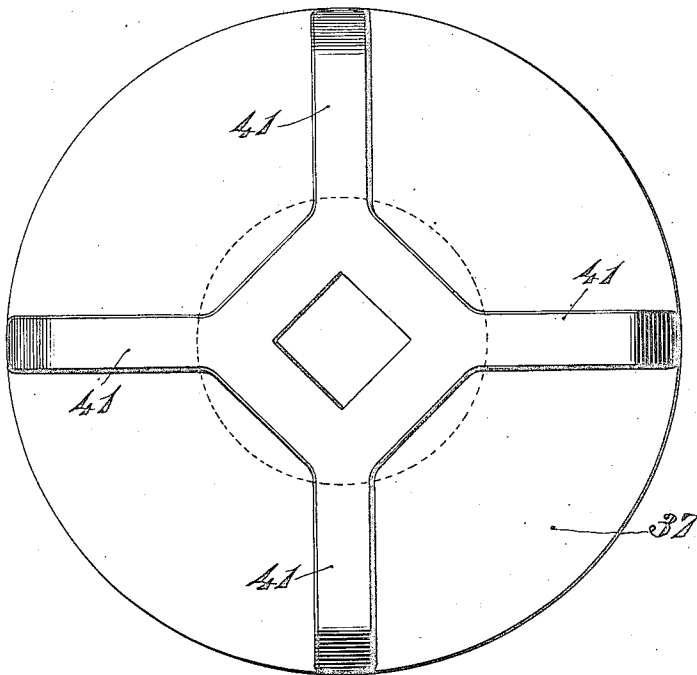


Fig. 4.

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UNITED STATES PATENT OFFICE.

THOMAS L. STURTEVANT, OF QUINCY, MASSACHUSETTS, ASSIGNOR TO STURTEVANT
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ROTARY-BEATER MILL.

1,212,419.

Specification of Letters Patent. Patented Jan. 16, 1917.

Application filed July 27, 1916. Serial No. 111,649.

To all whom it may concern:

Be it known that I, THOMAS L. STURTEVANT, a citizen of the United States, residing at Quincy, in the county of Norfolk and State of Massachusetts, have invented or discovered certain new and useful Improvements in Rotary-Beater Mills, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to that class of crushing and pulverizing mills employing hinged or pivoted rotary beaters, and the invention has for its object to provide a vertical mill of this type which will be simple in construction and efficient in operation.

In the accompanying drawings Figure 1 is a vertical section of a rotary beater mill embodying the present invention, and Fig. 2 is a view of the same, taken at right angles to Fig. 1, partly in elevation and partly in vertical section. Figs. 3 and 4 are detail views illustrating a modified form of the invention.

Referring to the drawings, 12 denotes the base of the mill which supports a spider 13 having a central hub 14 in which fits a bearing sleeve 15 having a flanged top 16. Rising from the base 12 are standards 17 which support a table 18 on which the mill casing parts 19 rest. The vertical mill shaft 20, provided with a driving pulley 21, is stepped in the bearing sleeve 15, the weight of said shaft being sustained by a ball-bearing 22 in said bearing sleeve which is adapted to contain lubricating oil.

The casing parts 19 are provided with ears 23 by which they are hinged to a vertical rod 24 partly supported by a bracket 25 so that said casing parts, when unbolted, may be swung aside horizontally like doors, thus affording convenient access to the mill chamber.

The vertical mill shaft 20 is journaled at its upper end in a roller bearing 26 housed in a sleeve 27 supported by the top-plate 28 of the mill, said sleeve being preferably provided with a cover 29 affording access to the lubricant-containing chamber 30 in said sleeve above said roller bearing. The sleeve 27 is provided, below said roller bearing, with a recess receiving a packing washer which serves to retain the oil by which said roller bearing is lubricated, and also serves to exclude dust or grit from said bearing.

Fixed to the table 18 is a sleeve 31 the

upper end of which is received in a recess at the lower end of a sleeve 32 pinned to the mill shaft 20. The overlapping parts of the sleeves 31 and 32 afford a dust-lock at the lower part of the mill chamber, to keep dust and grit away from the vertical mill shaft 20.

The sleeve 32 has an integral flange 32^a through which and a series of spaced disks 33 pass the hinge pins 34 of the hinged or pivoted rotary beaters 35. Most of the disks 33 are spaced apart by rings or bushings 35^b, these parts being supported by the sleeve 32 fixed to the shaft 20. The said shaft 20 is preferably square in cross-section, so that said disks and rings or bushings on said shaft will rotate therewith without being fixedly secured thereto. The parts 33 and 35^b might, however, be formed in one piece with the sleeve 32.

The outer ends of the hinged or pivoted rotary beaters 35 are preferably inclined, as shown, said beaters cooperating with stationary crushing elements consisting of corrugated liners or blocks 36 attached to the inside of the casing parts 19 and preferably formed in steps affording inclined faces, opposite the inclined ends of said beaters, and horizontal shelves above which said beaters work. Owing to this construction the crushing spaces between the inclined outer ends of the rotary beaters and the inclined faces of the corrugated liners may be varied, for the purpose of taking up wear, or for varying the fineness of the output of the mill, by adjusting the said shaft 20 vertically by means of the adjusting bars 43 on which the flange 16 of the bearing sleeve 15 rests, said bars being pivoted to one of the standards 17 and jointed at their free ends to a head 44 at the lower end of a rod 45 extending through a bearing lug 46 on the machine frame, said rod being threaded at its upper end for the reception of a hand wheel 47 which may be turned to raise and lower the adjusting bars 43.

The mill thus far described is similar to that shown and described in the application of T. J. Sturtevant filed simultaneously herewith, Serial No. 111,648, but this present improved mill comprises a horizontal table 37 arranged below the relatively heavy hinged beaters 35^a and above the lighter beaters 35. This table may be formed integral with a hub 38 rotating with the ver-

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tical shaft 20, said hub carrying pins 39 on which the heavy beaters 35^a are hinged or pivoted. This table 37 serves as a receiving and detaining table to check the downward movement of the material, so that the larger pieces will be detained thereby for further reduction by the heavy hinged beaters 35^a cooperating with stationary crushing elements consisting preferably of corrugated breaking plates or liners 40 in the upper part of the mill chamber. The space between the receiving and detaining table 37 and the upper ends of the corrugated liners 36 may be varied, to regulate the fineness of the material which may pass downward to be pulverized by the rotary beaters 35, by adjusting the shaft 20 vertically by the means hereinbefore described. By virtue of the receiving and detaining table 37, above which there is ample space in the mill chamber for the reception of quite large pieces of material, all such large pieces of material will be detained in the upper part of the mill chamber until properly broken up.

Instead of employing hinged or pivoted rotary beaters above the table 37 the heavy rotary crushing beaters, to the action of which the material is first subjected, may be cast solid with said table, and in such case these heavy beaters will consist of radial ribs 41, integral with the table 37, as shown in the detail view Figs. 3 and 4. This receiving and detaining table, arranged between the heavy crushing beaters in the upper part of the mill chamber, (and to the action of which heavy crushing beaters the coarser material, fed to the mill chamber from an upper hopper is first subjected,) and the lower pulverizing beaters in the lower part of the mill chamber, is an important improvement in this class of mills, in that it contributes greatly to the working efficiency thereof; and will also prove useful and efficient in cooperation with upper beaters which may not be heavier or more massive than the lower beaters.

Having thus described my invention I claim and desire to secure by Letters Patent:

1. In a vertical rotary beater mill, the combination with a mill casing and a vertical shaft rotating therein, of a receiving and detaining table arranged in the upper part of the mill chamber and rotating with said shaft, rotary beaters above said table in the upper part of the mill chamber, hinged or pivoted rotary beaters below said table in the lower part of the mill chamber, said beaters being connected with said shaft to rotate therewith, and stationary crushing elements cooperating with said beaters.

2. In a vertical rotary beater mill, the combination with a mill casing and a vertical shaft rotating therein, of a receiving and detaining table arranged in the upper part of the mill chamber and rotating with said shaft, hinged or pivoted rotary beaters above said table in the upper part of the mill chamber, hinged or pivoted rotary beaters below said table in the lower part of the mill chamber, said beaters being connected with said shaft to rotate therewith, and stationary crushing elements cooperating with said beaters.

3. In a vertical rotary beater mill, the combination with a mill casing and a vertical shaft rotating therein, of a receiving and detaining table arranged in the upper part of the mill chamber and rotating with said shaft, rotary beaters above said table in the upper part of the mill chamber, hinged or pivoted rotary beaters below said table in the lower part of the mill chamber, said beaters having inclined outer ends and being connected with said shaft to rotate therewith, stationary crushing elements cooperating with said beaters and having inner face parts which are inclined reversely to the outer end faces of said beaters, and means for adjusting said shaft vertically to vary the position of said table and beaters relative to said stationary crushing elements.

4. In a vertical rotary beater mill, the combination with a mill casing and a vertical shaft rotating therein, of a receiving and detaining table arranged in the upper part of the mill chamber and rotating with said shaft, hinged or pivoted rotary beaters above said table in the upper part of the mill chamber, hinged or pivoted rotary beaters below said table in the lower part of the mill chamber, said beaters having inclined outer ends and being connected with said shaft to rotate therewith, stationary crushing elements cooperating with said beaters and having inner face parts which are inclined reversely to the outer faces of said beaters, and means for adjusting said shaft vertically to vary the position of said table and beaters relative to said stationary crushing elements.

5. In a vertical rotary beater mill, the combination with a mill casing, provided at its upper part with a feed opening for the introduction of material to be crushed, and a vertical shaft rotating in the chamber afforded by said casing, of a receiving and detaining table arranged in the upper part of the mill chamber and rotating with said shaft, relatively heavy crushing rotary beaters above said table in the upper part of the mill chamber, relatively light pulverizing rotary beaters below said table in the lower part of the mill chamber, said beaters being

connected with said shaft to rotate therewith, and stationary crushing elements cooperating with said beaters.

6. In a vertical rotary beater mill, the combination with a mill casing and a vertical shaft rotating therein, of a receiving and detaining table arranged in the upper part of the mill chamber and rotating with said shaft, relatively heavy, hinged or pivoted crushing rotary beaters above said table in the upper part of the mill chamber, relatively light, hinged or pivoted pulverizing rotary beaters below said table in the lower part of the mill chamber, said beaters being connected with said shaft to rotate therewith, and stationary crushing elements cooperating with said beaters.

7. In a vertical rotary beater mill, the combination with a mill casing and a vertical shaft rotating therein, of a receiving and detaining table arranged in the upper part of the mill chamber and rotating with said shaft, relatively heavy crushing rotary beaters above said table in the upper part of the mill chamber, relatively light pulverizing rotary beaters below said table in the lower part of the mill chamber, said beaters having inclined outer ends and being connected with said shaft to rotate therewith, station-

ary crushing elements cooperating with said beaters and having inner face parts which are inclined reversely to the outer faces of said beaters, and means for adjusting said shaft vertically to vary the position of said table and beaters relatively to said stationary crushing elements.

8. In a vertical rotary beater mill, the combination with a mill casing and a vertical shaft rotating therein, of a receiving and detaining table arranged in the upper part of the mill chamber and rotating with said shaft, relatively heavy, hinged or pivoted crushing rotary beaters above said table in the upper part of the mill chamber, relatively light, hinged or pivoted pulverizing rotary beaters below said table in the lower part of the mill chamber, said beaters having inclined outer ends and being connected with said shaft to rotate therewith, stationary crushing elements cooperating with said beaters and having inner face parts which are inclined reversely to the outer faces of said beaters, and means for adjusting said shaft vertically to vary the position of said table and beaters relative to said stationary or crushing elements.

In testimony whereof I affix my signature.
THOMAS L. STURTEVANT.