

(No Model.)

3 Sheets—Sheet 1.

C. W. VAUGHN.  
CLAY MILL.

No. 494,515.

Patented Mar. 28, 1893.

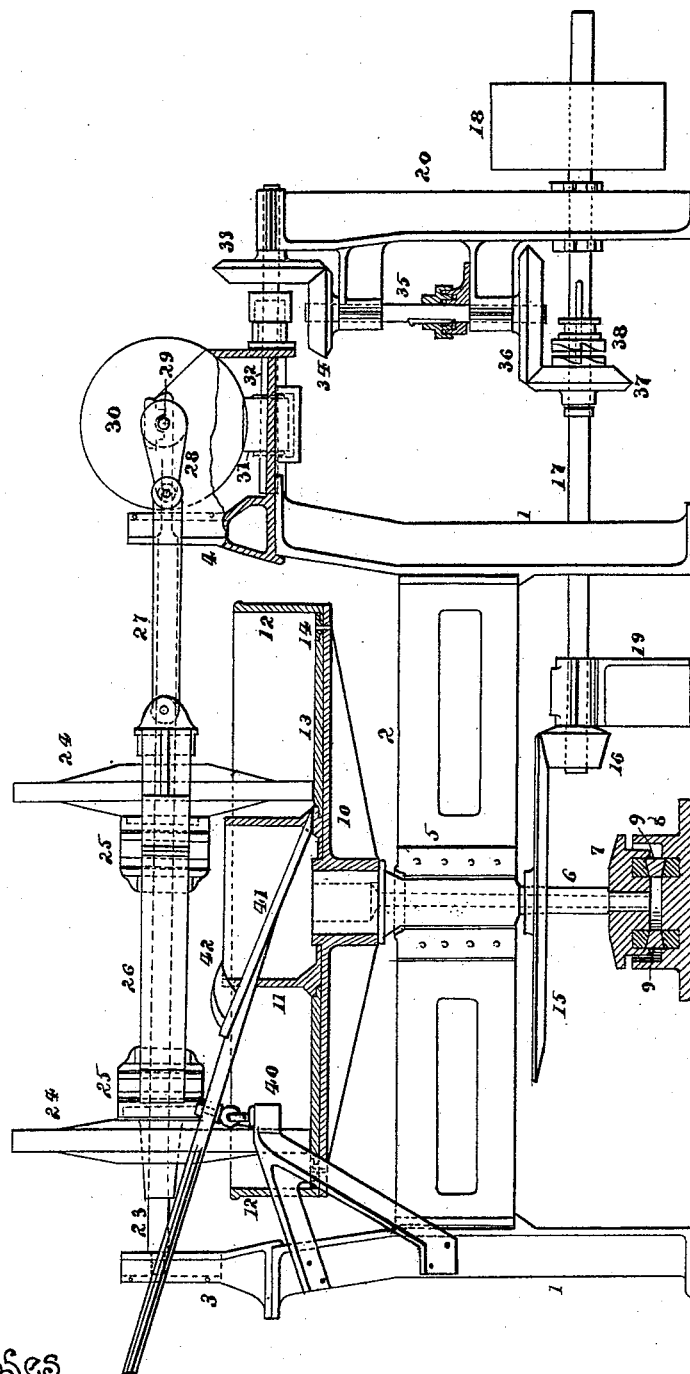


Fig. 1.

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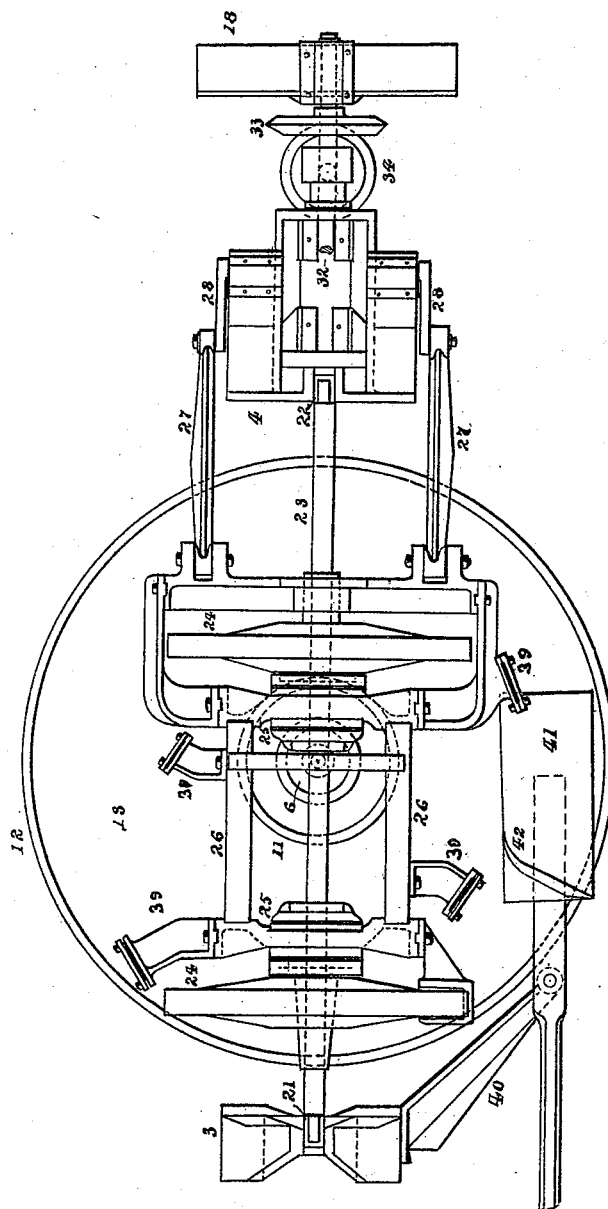


Fig. 2.

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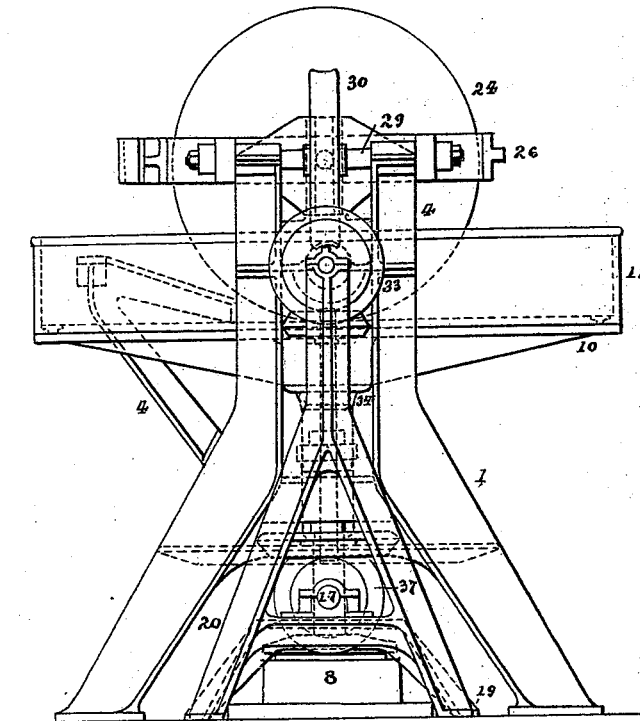
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3 Sheets—Sheet 3.

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*Fig. 3.*

Witnesses

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Inventor

*Calvin W. Vaughn*

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# UNITED STATES PATENT OFFICE.

CALVIN W. VAUGHN, OF CUYAHOGA FALLS, OHIO.

## CLAY-MILL.

SPECIFICATION forming part of Letters Patent No. 494,515, dated March 28, 1893.

Application filed August 20, 1892. Serial No. 443,657. (No model.)

*To all whom it may concern:*

Be it known that I, CALVIN W. VAUGHN, a citizen of the United States, residing at Cuyahoga Falls, in the county of Summit and State of Ohio, have invented a certain new and useful Improvement in Clay-Mills, of which the following is a specification.

My invention has relation to improvements in that class of mills for grinding clay and other minerals, in which the material is crushed in an annular horizontal pan or bed by vertical wheels, which travel on said pan or bed. There are two kinds of mills of this class, one in which the bed is fixed and the wheels travel around the bed and at the same time cross and re-cross it; the other in which the bed or pan revolves, and the wheels mounted on a fixed horizontal shaft maintain the same relative position at all times, and do not cross the bed.

The object of my invention is the production of a new and improved mill of the class referred to, which shall combine the advantageous features of the two kinds of mills just referred to, and in simple and effective mechanism to carry out this object; and as further and resulting objects, decrease the resistance and thereby increase the efficiency of the machine; and reduce vibration and jar, and consequent noise, and wear to the machine itself, and to the building in which it is located.

To the aforesaid objects my invention consists in a peculiar construction, arrangement and combination of parts hereinafter described, and then specifically pointed out in the claims, reference being had to the accompanying drawings forming a part of this specification.

In the accompanying drawings, in which similar reference numerals indicate like parts in the several views, Figure 1, is an outline, side elevation of my improved clay mill, the pan, step, and part of the wheel-shifting mechanism shown in vertical central section; Fig. 2, a plan of the same; and Fig. 3, an end elevation.

The grinding mechanism is mounted in a suitable frame, consisting of two uprights 1, 1, resting on a solid foundation, between and uniting which is a cross-beam or girt 2, and on the tops of which are housings 3, 4, the

contiguous parts being firmly bolted together. In the center of the girt 2, is a long vertical journal box 5, in which is journaled a shaft 6, preferably hollow, as shown, to avoid unnecessary weight, the upper end being turned and provided with a shoulder to fit and support the pan hereinafter described; and the lower end having a cap 7, that runs in the step 8, on conical rollers 9, the adjacent faces of the cap and step being provided with hardened annular tracks for said rollers. On the top of the shaft 6, is the pan consisting of a circular plate or disk which constitutes its bed 10, suitably braced by radial webs, having about its center and outer edge annular rims or curbs 11, 12. Between these rims is the false bed, consisting of an annular plate 13, made detachable by being formed in sections, its edges rabbeted, the inner held under a flange on the rim 11, and its outer held by a rabbeted ring 14, retained by bolts. On the shaft 6, below the girt, is a larger bevel gear 15, which meshes in a smaller gear 16, mounted on a shaft 17, which bears at its outer end a driving pulley 18, and by means of which the pan is revolved. The shaft 18, is journaled in boxes in supports 19, 20, both resting on the base, the latter extending upward to support wheel-shifting machinery hereinafter described.

In upright ways in the housings 3, 4, are sliding boxes 21, 22, in which is journaled a shaft 23, on which are freely mounted the grinding wheels 24, 24. These wheels are provided with long hubs, which are connected by means of flanged collars 25, to the cross bars of a yoke 26, which slides longitudinally on the shaft 23, and by which the wheels are constantly held equidistant, and may be simultaneously moved radially across the bed 13, of the pan, one toward the inner rim 11, and one toward the outer rim 12, and vice versa. The yoke 26, is moved reciprocally across the pan by connecting rods 27, 27, from crank arms 28, on the ends of a shaft 29, journaled in bearings in the housing 4, which bears a worm wheel 30, (omitted in Fig. 2,) turned by a worm 31. The worm 31, runs in a cup of oil in the bottom plate of the housing 4, and is mounted on a shaft 32, journaled in boxes in said housing, and which also bears a bevel gear 33, which meshes in a bevel gear

34, on the upper end of the vertical shaft 35, journaled in boxes in the support 20. The shaft 35, bears at its lower end a bevel gear 36, which meshes in a bevel gear 37, loosely mounted on the shaft 17, with which it is connected or disconnected by the clutch 38.

From the foregoing description it will be apparent that as the pan is revolved, the grinding wheels will travel on its bed, and at the same time slowly cross and re-cross the same, excepting the shifting mechanism be thrown out of gear by the clutch 38, and thus all parts of the bed will be repeatedly traversed, and the material thereon repeatedly subjected to the crushing action of the wheels.

Attached to the yoke 26, are four brackets 39, their outer ends containing clamping plates and bolts in which are clamped scrapers consisting of straight steel blades, arranged at such an angle as to continually scrape the material from the inner and outer rims as the pan revolves, and throw it in the track of the wheels.

Attached to one of the uprights 1, is a bracket 40, to the outer end of which is connected by a link joint a shovel 41, arranged to be swung into the pan and with its edge on the bed thereof and opposite to the motion of pan. Diagonally across the top of this shovel is a raised curved flange 42, its inner end being nearest the edge of the shovel blade, so that when placed in the pan, the material will be forced onto and up the shovel blade until, encountering the flange 42, it will be deflected and fall outside the outer rim 12, thus removing the contents of the pan by the power of the machine, excepting the last portion, which is lifted out with the shovel.

By the construction and arrangement of this machine, while I secure all the effects of machines in which the bed is stationary and the wheels travel around it, I reduce the jar, vibration and consequent noise and wear incident to those machines, arising from the light connection and construction of the driving parts, which consist of a central vertical shaft, driving a transverse horizontal shaft on which the wheels run, a jar and vibration being particularly noticeable when the wheels are at

different distances from the center, and which is increased by the centrifugal force alternately exerted by them.

By the rigidity of the wheel shaft, also supported as it is at each end, and the entire absence of this centrifugal force, I am enabled to drive the pan under the wheels and grind a given quantity of material with less power, than when the wheels are driven around over the bed.

I claim as my invention—

1. In a clay mill of the class designated, the combination with a horizontal pan arranged to be horizontally revolved, of two wheels journaled on a stationary, horizontal axle, arranged to travel in said pan, and provided with means for causing them to move reciprocally horizontally in the line of their axle radially between the center and outer rim of said pan, as set forth.

2. In a clay mill of the class designated, the horizontal pan having inner and outer rims, and means for horizontally revolving it, and a stationary, horizontal axle above said pan, combined with two wheels journaled on said axle and arranged to travel on the bed of said pan between the inner and outer rims, a yoke uniting said wheels, and means for moving said frame reciprocally parallel with the axis of said stationary axle, substantially as shown and described.

3. The combination with the horizontal pan and its shaft, the horizontal driving shaft, and the bevel gears on said shafts, and the stationary axle, and the wheels mounted thereon, and the frame uniting said wheels, of the connecting rods, the crank shaft and its arms and worm wheel, the worm and its shaft and the bevel gears and vertical shaft for communicating motion from said main driving shaft to said frame, substantially as shown and described.

In testimony that I claim the above I hereunto set my hand.

CALVIN W. VAUGHN.

Witnesses:

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C. E. HUMPHREY.