

H. B. CAMP.

CLAY DISINTEGRATING AND SEPARATING MILL.

No. 452,895.

Patented May 26, 1891.

Fig. 2,

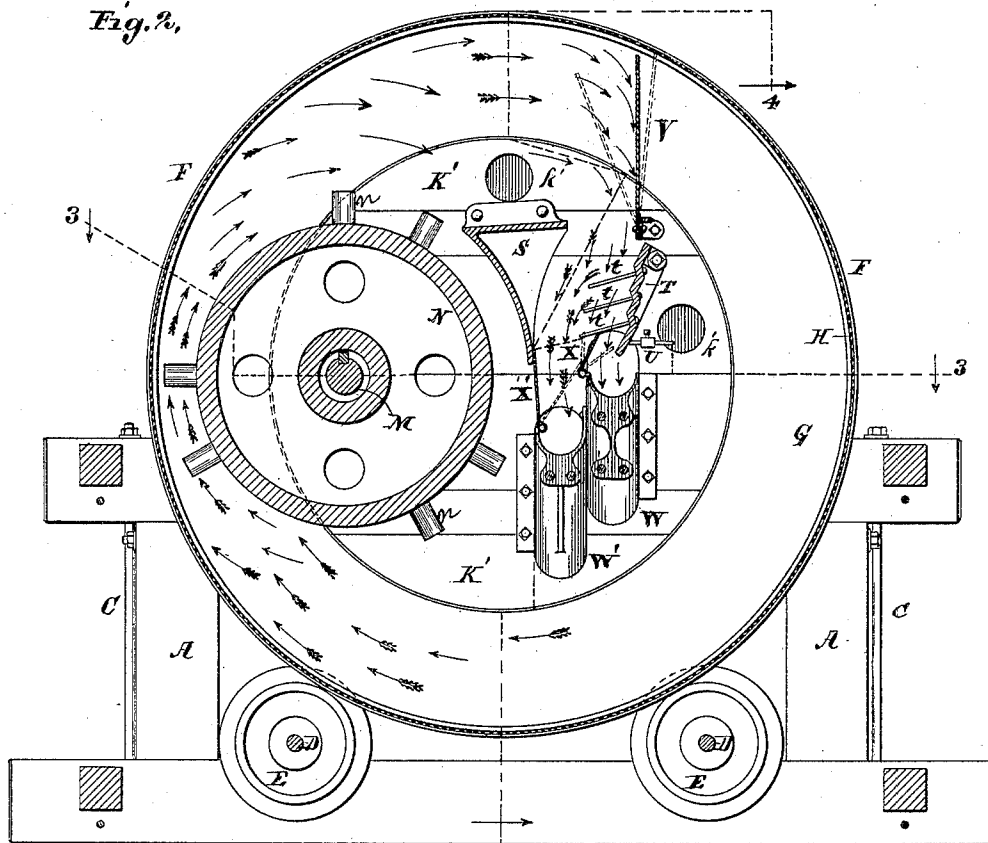
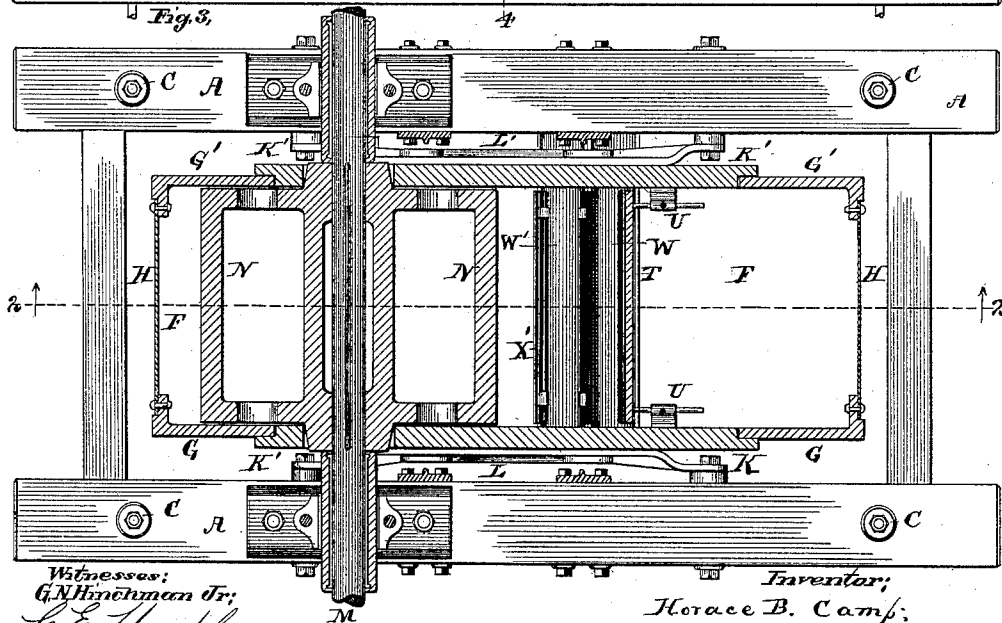


Fig. 3,



Witnesses;
G. N. Hutchinson Jr.,
C. C. Humphrey.

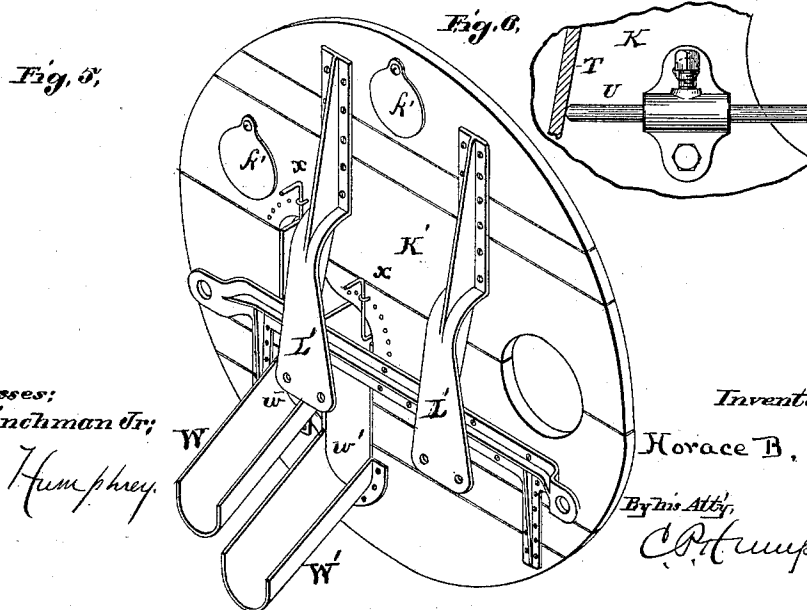
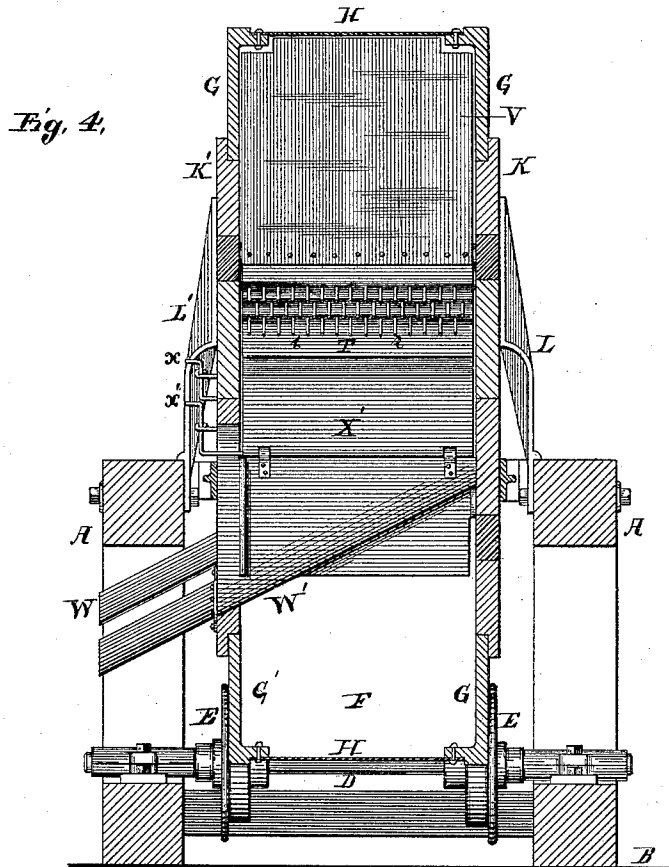
Inventor;
Horace B. Camp;
By his Att'y,
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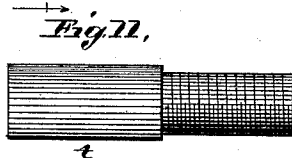
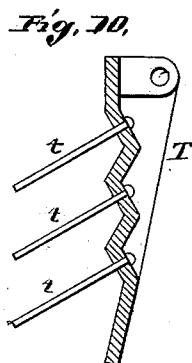
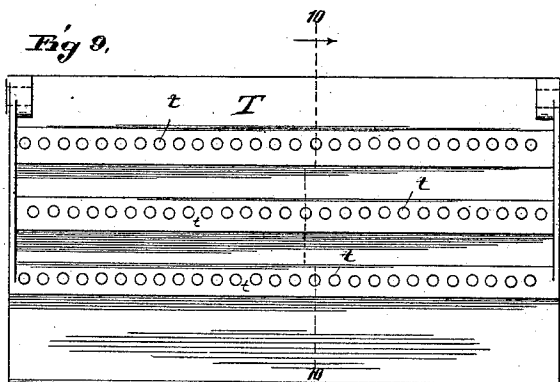
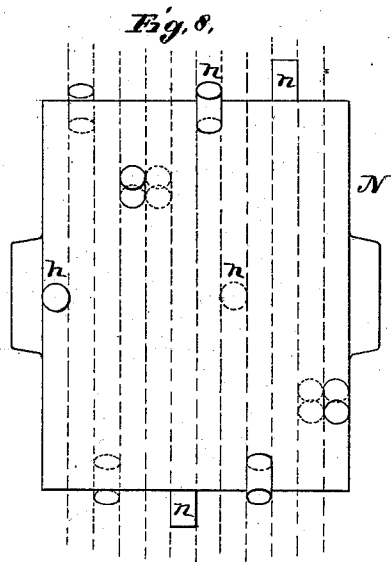
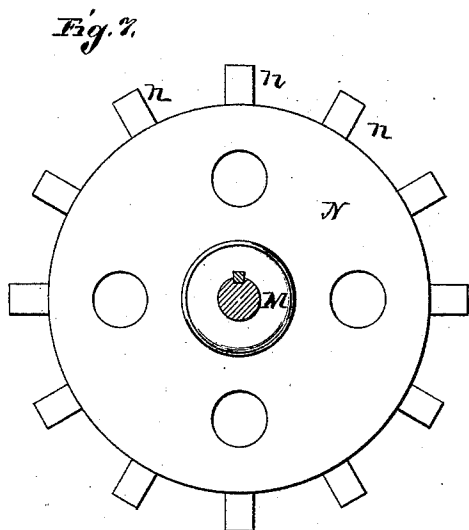
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UNITED STATES PATENT OFFICE.

HORACE B. CAMP, OF CUYAHOGA FALLS, OHIO.

CLAY DISINTEGRATING AND SEPARATING MILL.

SPECIFICATION forming part of Letters Patent No. 452,895, dated May 26, 1891.

Application filed May 5, 1890. Serial No. 350,601. (No model.)

To all whom it may concern:

Be it known that I, HORACE B. CAMP, 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 Disintegrating and Separating Mill, of which the following is a specification.

My invention has relation to improvements in machines for grinding or reducing natural substances, as sandstone, potters' and sewer-pipe clay, and other analogous material, and is especially adapted for reducing natural clay to fit it for the construction of pottery, sewer-pipe, and other articles.

The objects of my invention are, first, by means of new and original devices to thoroughly disintegrate the masses of material, as clay, and reduce them to any requisite degree of fineness; second, to separate from the finer parts the unground particles and again subject them to the disintegrating devices; third, to separate from the disintegrated material foreign substances and solid particles, and, fourth, to produce a new and improved machine to accomplish the above results.

To the above objects my invention consists in the peculiar and novel construction and combination of parts, as 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 letters of reference indicate like parts, Figure 1 is a side elevation of my machine; Fig. 2, a vertical longitudinal section of the same on the line 2 2 of Fig. 3; Fig. 3, a horizontal section on the line 3 3 of Fig. 2; Fig. 4, a transverse vertical section on the line 4 4 of Fig. 2; Fig. 5, a detail perspective view of the cover opposite the one shown in Fig. 1 for the opening in the revolving drum, showing outlets for the drum and supports for the cover; Fig. 6, an enlarged detail view of the adjusting-bolt for retaining the screen; Fig. 7, an end elevation of the disintegrating-cylinder in outline; Fig. 8, a side elevation of the same in outline; Fig. 9, a rear elevation of the screen; Fig. 10, a vertical transverse section of the same at the line 10 10 of Fig. 9; Fig. 11, a detail elevation of one of the disintegrating-pins.

Referring to these drawings, A is a frame, preferably of wood beams, as shown, resting on a floor B, and attached thereto by bolts C. Mounted on axles D, journaled in bearings on the frame A, are flanged rollers E. Resting and revolvably mounted on the rollers E is a drum F, consisting of two oppositely-disposed annular disks G G', preferably of cast metal, united by a shell or hoop H, preferably of sheet metal, bolted to inner annular flanges extending from said disks. This drum is revolved by means of a belt I from a pulley J, which latter is driven by the motive power of the machine. In the opposite end openings of this drum are doors or covers K K', which are respectively rigidly attached to the frame A by brackets or straps L L', and which serve to sustain certain parts of the mechanism inside of said drum, hereinafter described, and also prevent the escape of material being subjected to the action of the machine. In the covers K K' are openings or hand-holes k k', covered with swinging doors, through which mechanism inside of said drum may be reached, and in the cover K is a door R, through which the material to be operated upon, as clay, is fed to the machine.

Journaled in suitable bearings on the frame A, and passing through openings in the covers K K' of the drum F, is a shaft M, which bears outside of the drum a pulley P, driven by a belt Q from any suitable part of the driving mechanism, and on which, inside of the drum, is mounted a cylinder N, inserted in and projecting from which are radial pins n.

Supported by and between the covers K K', inside, lengthwise, and parallel with the axis of the drum, is a shield S, preferably made, as shown, of sheet or cast metal and having a flat horizontal top or shelf and a depending curved apron concentric with the cylinder N, and for a purpose to be hereinafter stated. Pivotaly suspended to and between the covers K K', inside the drum and parallel with its axis, is a plate T, in which is mounted a series of parallel pins t, projecting downward and toward the cylinder N. This plate is preferably made corrugated, as shown, and the pins inserted in the retreating faces for the twofold purpose of facility in drilling the holes for the pins at a

right angle with the plate and preventing the accumulation of material driven by the cylinder N adhering to the plate about the pins *t*. Adjustable devices, as sliding bolts 5 U U' in sockets attached to the inside of the covers K K' and provided with set-screws reached through hand-holes in the covers, serve to retain the plate T at any desired angle from a perpendicular.

10 Above the plate T is a swinging gate V, pivotally supported in the covers K K', for a purpose to be hereinafter stated. Horizontally below and substantially between the shield S and plate T are two parallel upwardly-open troughs W W', preferably vertically parallel with the axis of the drum, inclined horizontally toward and extending through the cover K', where they are closed by doors *w w'*. The trough W is preferably 20 higher than the trough W', and the two are so disposed that the finer particles of material, sliding along the face of the plate T and passing between the pins *t*, enter the former, while the coarser particles and foreign unbroken substances, sliding over the pins *t*, fall into the latter, by both of which troughs the separated particles pass out of the drum. Pivotally supported in and between the covers K K' are swinging doors or gates X X', 30 the former adapted to swing across the trough W and encounter the lower edge of the plate T, thereby preventing the entrance of the disintegrated material, and the latter arranged to swing between the lower edge of the shield S and gate X and in a similar manner prevent the entrance of the material into the trough W'.

The operation of the machine will be best understood by assuming that it is used for 40 disintegrating masses of natural clay as they are dug from the bed and separating therefrom pebbles and other foreign substances.

In operation the drum and the inclosed beating-cylinder N are each revolved in the 45 same direction, the speed of the latter greatly exceeding that of the former. The relative degrees of speed of these parts will be determined by the character of the material to be disintegrated, as in some instances it is readily 50 reduced, while in others it requires to be violently beaten. The parts being in motion, as I have described, the material, as clay, is fed into the drum through the door R, and is carried up on its inner periphery until it is encountered by the pins *n* of the rapidly-revolving cylinder N, by which it is beaten, broken, and driven forward about the upper part of the drum until it encounters the gate V, by which its disintegrated particles are deflected 60 and fall onto the plate T and the pins *t* projecting therefrom. The finer particles (indicated in Fig. 2 by plain arrows) fall between the pins *t* and enter the spout W, while the coarser particles and foreign substances (indicated by feathered arrows) pass over these 65 pins and enter the trough W'. The shield S

prevents the disintegrated material being cast directly against the plate T, and also serves to return the coarser particles to the bottom of the drum to be again subjected to the beating-cylinder. The nature of the material to be treated and the speed of the operative parts of the machine will determine the degree of deflection of the gate V, which is adjustable to different angles from a perpendicular, as indicated in the dotted lines, Fig. 2. When it is desired to repeatedly subject the material to the operation of the disintegrating-cylinder N, the doors X X' are swung over the troughs W W' by handles *x x'*, which extend through the cover K', and the material again falls to the lower part of the drum.

I do not attempt in this application to give precise relative proportions or positions of 85 the respective parts of my invention, as these will necessarily differ with the different requirements of the machine—as, for instance, the disintegrating-cylinder may be smaller or greater and its axis radially and horizontally 90 different than shown—and it is obvious that the arrangement and form of the pins *t* will be regulated by the requisite degree of fineness of the disintegrated material. Nor do I confine my invention to the exact assemblage 95 of parts shown, as one of the troughs W W', and incidentally one of the gates X X', may be omitted and other changes in matter of detail made without departing from my invention. Nor do I intend hereby to limit the 100 general features of the drum, the internally-mounted disintegrating-cylinder, and the end covers to a disintegrating-machine, but reserve the right to embody them in a clay-tempering machine for which I have made 105 application for Letters Patent under the date of July 21, 1890, Serial No. 359,356.

I claim—

1. A disintegrating apparatus consisting of a horizontal revolubly-mounted drum, a disintegrating-cylinder revolubly mounted inside of, parallel with, and axially eccentric thereto in bearings outside thereof, and means for simultaneously revolving said drum and cylinder at different degrees of 115 speed, substantially as shown and described.

2. In a disintegrating-machine, the combination, with a revolving drum, of a disintegrating-cylinder revolubly mounted inside of said drum and axially eccentric thereto, and covers 120 arranged to close the end openings of the drum and having a feeding-door and a discharge-spout, substantially as shown and described.

3. In a disintegrating-machine, the combination, with a supporting-frame, of a drum revolubly mounted in rollers in said frame, a shaft journaled in bearings in said frame, passing through end openings in and axially eccentric thereto, and bearing inside of said 130 drum a disintegrating-cylinder, and means, as belts and pulleys, for simultaneously revol-

ing said drum and cylinder with different rates of speed, substantially as shown and described.

4. The combination, with the revolubly-mounted drum and disintegrating-cylinder, of an adjustable door V to arrest the disintegrated material cast off by said cylinder and deflect it toward the bottom of the drum, substantially as shown.

5. The combination, with the revolubly-mounted drum and the disintegrating-cylinder, of a screen, as T, to separate the finer particles of disintegrated material, and a spout, as W, to receive such finer particles and convey them out of said drum, substantially as shown and described.

6. The combination, with the drum and disintegrating-cylinder, of a screen, as T, to separate and grade the disintegrated material, and two spouts, as W W', to receive the different grades from said screen and convey them outside of the drum, substantially as shown and described.

7. In a disintegrating apparatus embodying a revolubly-mounted drum and a disintegrating-cylinder revolubly mounted inside of said drum, the combination, with a screening device to separate and grade the disintegrated material, of troughs to receive and convey the separated material from the drum, and gates, as X X', to respectively prevent the entrance of material into said troughs, substantially as shown, and for the purpose specified.

8. The combination, with the revolving drum, disintegrating-cylinder, and screen, of a shield, as S, to prevent particles of material being driven by the disintegrating-cylinder against said screen, substantially as shown and described.

9. The combination, with the revolubly-mounted drum and the disintegrating-cylinder, of a screen consisting of a plate, as T,

pivottally mounted across said drum, having a series of projecting pins, as t, and adjustable devices, as a bolt and set-screw, to retain it at any angle from a perpendicular, substantially as shown and described.

10. The herein-described screen for disintegrating-machines, consisting of a plate arranged to be pivottally suspended from one edge, having a face corrugated by a series of horizontal parallel faces alternately turned in opposite directions, and series of parallel pins inserted in and projecting in the same direction from alternate faces, substantially as shown and described.

11. In a disintegrating-mill, the combination, with a horizontal drum having end openings and revolubly mounted in a supporting-frame, of a disintegrating apparatus consisting of a single cylinder revolubly mounted inside of, parallel with, and axially eccentric to said drum in bearings outside thereof, having radial pins projecting from its periphery, and means, as belts and pulleys, for simultaneously revolving said drum and cylinder in the same direction with different degrees of speed, substantially as shown and described.

12. A disintegrating-machine embodying the following elements: a supporting-frame, a drum having end openings revolubly mounted thereon, a disintegrating-cylinder revolubly mounted inside of said drum, a deflecting-door, as V, a shield, as S, a screen, as T, and discharge-spouts, as W W', provided with covers, as X X', all constructed and arranged substantially as shown and described.

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

HORACE B. CAMP.

In presence of—

C. P. HUMPHREY,
C. E. HUMPHREY.