(No Model.) 2 Sheets—Sheet 1.

J. A. ALBERTSON & J. H. FISHER.

CEMENT MILL.

No. 524,233. Patented Aug. 7, 1894.

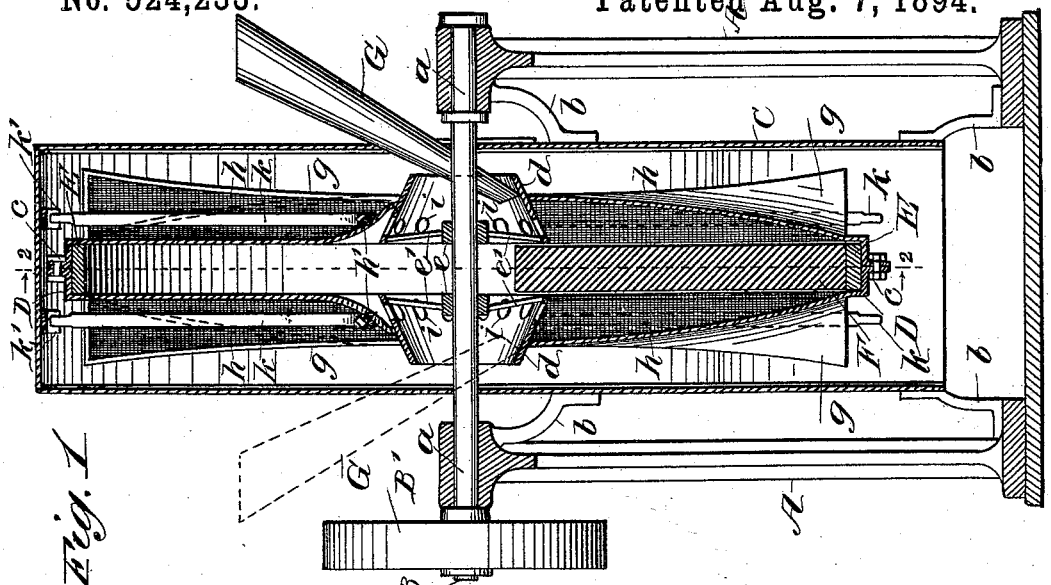

Fig. 1

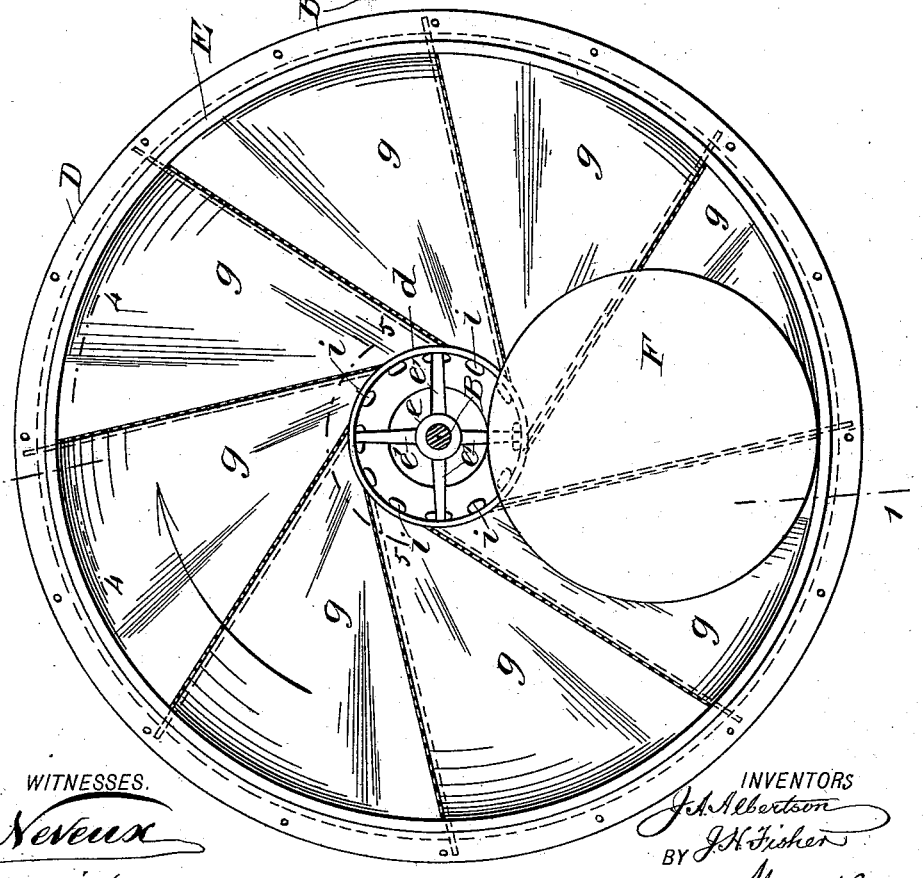

Fig. 2

WITNESSES.

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Fig. 4

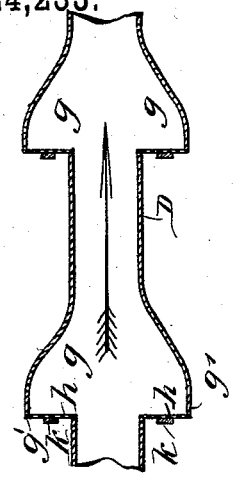


Fig. 5

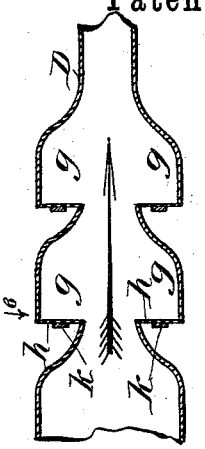


Fig. 6

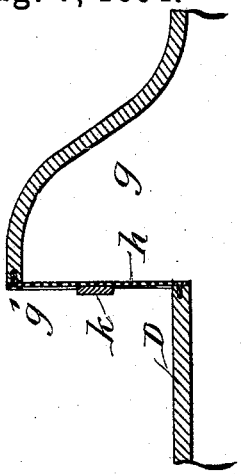
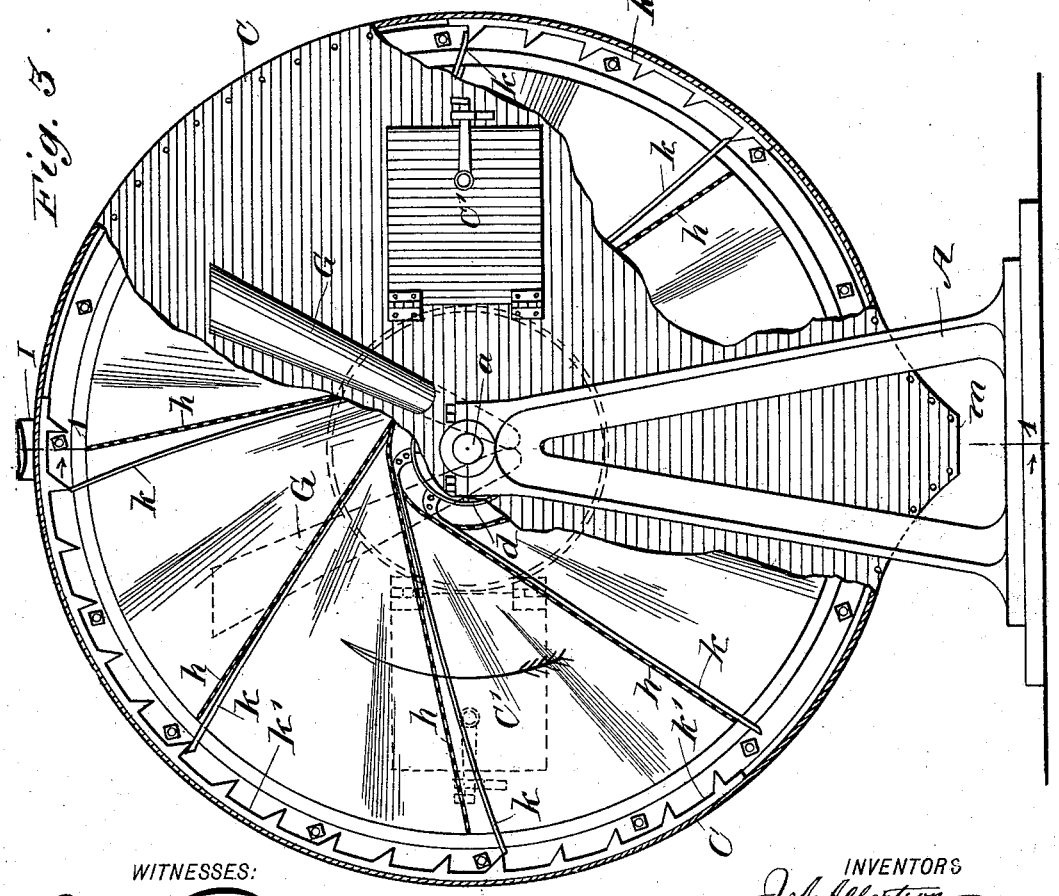


Fig. 3



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN A. ALBERTSON, OF LANSFORD, AND JAMES H. FISHER, OF SIEGFRIED'S BRIDGE, PENNSYLVANIA.

CEMENT-MILL.

SPECIFICATION forming part of Letters Patent No. 524,233, dated August 7, 1894.

Application filed September 6, 1893. Serial No. 484,890. (No model.)

To all whom it may concern:

Be it known that we, JOHN A. ALBERTSON, of Lansford, in the county of Carbon, and JAMES H. FISHER, of Siegfried's Bridge, in the county of Northampton, State of Pennsylvania, have jointly invented a new and useful Improved Cement-Mill, of which the following is a full, clear, and exact description.

Our invention relates to improvements in mills for the reduction to powder of cement, plaster of paris, ores, mineral paint, and other substances of a like nature that require pulverizing to expedite the separation of component elements, or for use as an entirety.

The objects of our invention are to provide a simple, easily operated and novel constructed mill, that will rapidly pulverize cement, or other material of a hard, rocky nature, and separate the powdered product from the coarser particles in the mill, expelling the completely pulverized part of the material that has been reduced in the improved mill, as the operation progresses.

A further object is, to provide novel means for keeping the screening device in the mill in an efficient working condition.

To these ends our invention consists in the construction and combination of parts, as is hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a transverse sectional view of the mill taken on the line 1—1 in Figs. 2 and 3. Fig. 2 is an enlarged partly sectional side view of details, on the line 2—2 in Fig. 1. Fig. 3 is a side view of the device, having its exterior shell broken away to expose interior parts. Fig. 4 is a transverse sectional view of novel details, on the curved line 4—4 in Fig. 2. Fig. 5 is a transverse sectional view, on the curved line 5—5 in Fig. 2; and Fig. 6 is an enlarged transverse sectional view of a broken detail of construction, the position of which is indicated by the arrows 6, in Fig. 5.

On an upright frame A, or equivalent device, the horizontal shaft B, is journaled at two points that are suitably separated to permit the case C, and contained mechanism to be located between the said journals *a*, as shown in Fig. 1, a pulley B′ affording means to transmit rotary motion to the shaft.

The case C, is substantially cylindrical in form, having parallel side walls, its dimensions being proportioned to suit the capacity of the mill proper, that it envelops. The case C, is maintained upright and in a vertical position, with the shaft B passing through its center, by braces *b*, or other means.

Within the case C, the concentrically arranged pulverizer shell D, is introduced, which consists of two similar half sections, that are joined together by screw bolts *c*, that pass through perforations in radial flanges formed on adjacent circular edges of the shell sections.

The side wall of each section of the shell D, is outwardly dished at its central portion, which walls merge into the conical walls of the similar feeding chambers *d*, that project within and also exterior of the pulverizer shell concentric with its peripheral wall, the smaller ends of these coniform walls being outermost. The wide bases of the coniform feeding chambers *d*, are located a suitable distance within the pulverizer shell, so that a correct degree of separation will be afforded to the true parallel terminal edges of said bases.

From the bases of the chambers *d*, the arms *e*′, are inwardly extended toward a common center for each set of arms, where they are joined to the hubs *e*, that are axially perforated in alignment, so as to fit upon the shaft B, on which they are secured, thus locating the pulverizer shell D, on the shaft and adapting it to have a rotary motion therewith.

Series of radial corrugations are oppositely formed in the side walls of the shell D, preferably at an even distance apart on each side wall, thereby projecting series of approximately radial pockets *g*, from the side walls preferably oppositely in pairs.

The radial projection of the sets of pockets *g*, causes them to be separated a greater degree near the periphery of the shell D, than at or near the coniform chambers *d*, as indicated plainly in Figs. 4 and 5. The outward sloping projection of each pocket *g*, produces a radial shoulder as at *g*′, in Fig. 6, and between said shoulder and the unprojected por-

tion of the dished side wall of the pulverizer shell D, a reticulated or foraminated screen wall *h*, is secured to cover the opening left in the side wall.

It will be seen that the screens *h* are essentially plane and extend about radially, being arranged at an angle or substantially perpendicular to the side walls of the shell D, and at an angle or approximately perpendicular to the periphery of the shell.

The series of screens *h*, in each side wall of the shell D, are extended from the periphery of the shell to the coniform chambers *d*, and spaces *h'* are formed between the screens and near the chambers by the outward curvature of the side walls at such points, so as to permit the passage of material that is to be pulverized through perforations *i*, in the walls of the chambers, and thence through the spaces into the interior of the shell, as shown above the shaft B in Fig. 1, the bulk of such crude material entering the shell through the spaces between the arms *e'*.

A track ring E, is fitted into the shell D, having a diameter that will adapt it to bear on the periphery of the latter, and a width that permits the side walls of the shell to be clamped on it by the bolts that secure the half sections of the shell together, said ring being made of hardened metal or other material that will withstand the abrasive action this part is subjected to in service.

A crushing roller F, is provided, which is made of any preferred material suited for its use, the roller having a thickness which will allow it to loosely engage the ring E whereon it is placed and rolls when the shaft B is revolved. The diameter of the roller F, is so proportioned that when in place, the inner true edge of the coniform chambers *d*, will have a loose contact with its sides near the periphery, which will steady the roller when the mill is in operation.

In front of each screen *h*, an elastic strip *k*, of wood or metal, is located, these similar pieces being projected at their outer ends beyond the periphery of the shell D, and near the inner surface of the case C. The inner ends of the pieces or strips *k* are secured upon the shell D, near the coniform chambers *d*, so that their outer ends will be adapted to forcibly strike upon the shell or screens, when said strips are drawn away from the latter and suddenly released. To vibrate the striker strips *k*, as these pieces are for convenience named, there are two sets of ratchet toothed racks *k'*, formed or secured within the case C, on its peripheral wall, as shown in Figs. 1 and 3, these having their teeth so spaced apart that the outer ends of the striker strips *k*, will be successively engaged by said teeth and be drawn away from the screens *h*, a suitable distance, and then released to slap upon the screens, which will jar them sufficiently to remove material that may be lodged in their meshes.

The rack on the left side of Fig. 3, is designed more particularly for the percussion of the screens to cause them to discharge ground material through their meshes, while the other rack on the right side of the same figure serves to remove compacted ground material from the reticulations of the screens as they successively pass the teeth of said rack.

The material to be operated upon, is fed into the mill through the spout G, that may be the lower terminal of a hopper, or an extension from a bin wherein a quantity of the un-ground material is stored, said spout being introduced through a close fitting hole in the side of the case C, and into the open end of one of the coniform chambers *d;* and if preferred, a feeding spout may be located on each side of the mill and be arranged to introduce material into both of the chambers *d*. Access to the interior of the case C, is afforded on each side by the hinged doors C', shown in Fig. 3.

A dust escape pipe I, is extended from the top of the case C, to remove such fine refuse from the mill, said pipe being extended to any desired point for a discharge of the dust, which may be a chamber especially provided for the purpose.

The ground material is allowed to escape from the lower portion of the case C, through a transverse aperture formed at *m*, therein, and a pipe may be attached to the case at this point for the transfer of the pulverized material to a suitable place for its discharge.

In operation, the substance that is to be pulverized in the mill, is fed into the shell D in graduated amount constantly, the quantity introduced depending upon its nature, rotary motion being communicated to the shaft B and shell D, by power applied to the shaft at one end of the same. The rotation of the shell in the direction of the arrows shown in Figs. 3, 4 and 5 will cause the roller to revolve, and crush the material introduced within the shell, between the periphery of the roller and the track ring E, and the powdered material working laterally as it is crushed, enters the pockets *g*, and is made to traverse the screens *h*, through which it is sifted and falls downwardly; such portion of the material as is not sufficiently pulverized, being returned to the track below the roller to be further crushed, the screens being maintained in working condition by the striker strips *k*, as before explained.

By reference to the upper portion of Fig. 1, it will be seen that the sides of the shell are spaced just enough to allow the roller F to revolve between them, and the ground material will thus be forced into the pocket *g*, and but a small quantity of the material, if any, will be able to get between the roller and the essentially plane portions of the shell sides, which by being in contact with the roller also form bearings for the same.

It is claimed for this mill that it will accomplish a large percentage of work for the power expended, in an efficient and rapid manner.

Having thus fully described our invention, we claim as new and desire to secure by Letters Patent—

1. A crushing mill, provided with a rotatable shell adapted to contain the material to be crushed, means, located within the shell, for crushing the material therein, essentially radial pockets projected outwardly from the sides of the shell, and radially extending screens for closing the said pockets, the screens being arranged at an angle both to the sides of the shell and to its periphery, to allow the material to pass through the screens by gravitation, substantially as described.

2. A crushing mill, provided with a rotatable shell having a continuous imperforate track ring and adapted to contain the material to be crushed, means loosely arranged within the shell and adapted to travel on the said track ring to crush the material, essentially radial pockets projected outwardly from the sides of the shell, and screens for closing the outlets of the pockets, the screens extending essentially radially and being arranged at an angle both to the sides of the shell and to the periphery thereof, whereby the material is allowed to pass through the screens by gravitation, while the crushing means travel on a continuous imperforate surface, substantially as described.

3. In a crushing mill, a rotary cylindrical shell, pockets at the sides of the shell, screens over the pockets, and elastic strips secured by one end to the shell and arranged to be successively vibrated and then released to strike the shell or screens, substantially as described.

4. In a crushing mill, an enveloping case, a rotary cylindrical pulverizer shell within the case secured upon and driven by a central rotatable shaft, pockets outwardly projected on the side of the shell and radiating from central circular open-ended feeding chambers thereon, screens over radial edges of the pockets, and a loose roller rotatable by its gravity within the shell below the shaft, substantially as described.

5. A crushing mill, provided with a rotatable shell whose central portion is outwardly dished, radially extending pockets projected outwardly from the sides of the shell, essentially conical feed chambers, arranged concentric with the axis of the shell, the walls of the said chambers being provided with openings leading into the interior of the shell proper and of the pockets, and a loose crushing roller located in the shell, substantially as described.

6. In a crushing mill, the combination with an enveloping case supported on a frame, a dust pipe on said case, and a discharging aperture at the base of said case, of a cylindrical pulverizing shell within the case, a track ring within the shell, series of radial pockets on the sides of the shell, screens over the outlets of said pockets, a feeding chamber at each side of the shell, a crushing roller within the shell, and a device for conveying material to the interior of the shell, substantially as shown and described.

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JAMES H. FISHER.

Witnesses:
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W. H. GRAVER.