

(No Model.)

2 Sheets—Sheet 1.

T. M. ROGERS.
PULVERIZING MACHINE.

No. 276,145.

Patented Apr. 17, 1883.

Fig. 3

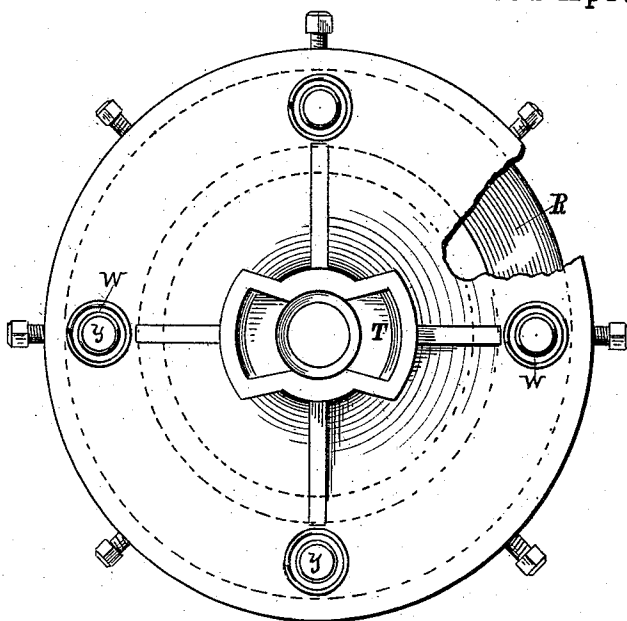
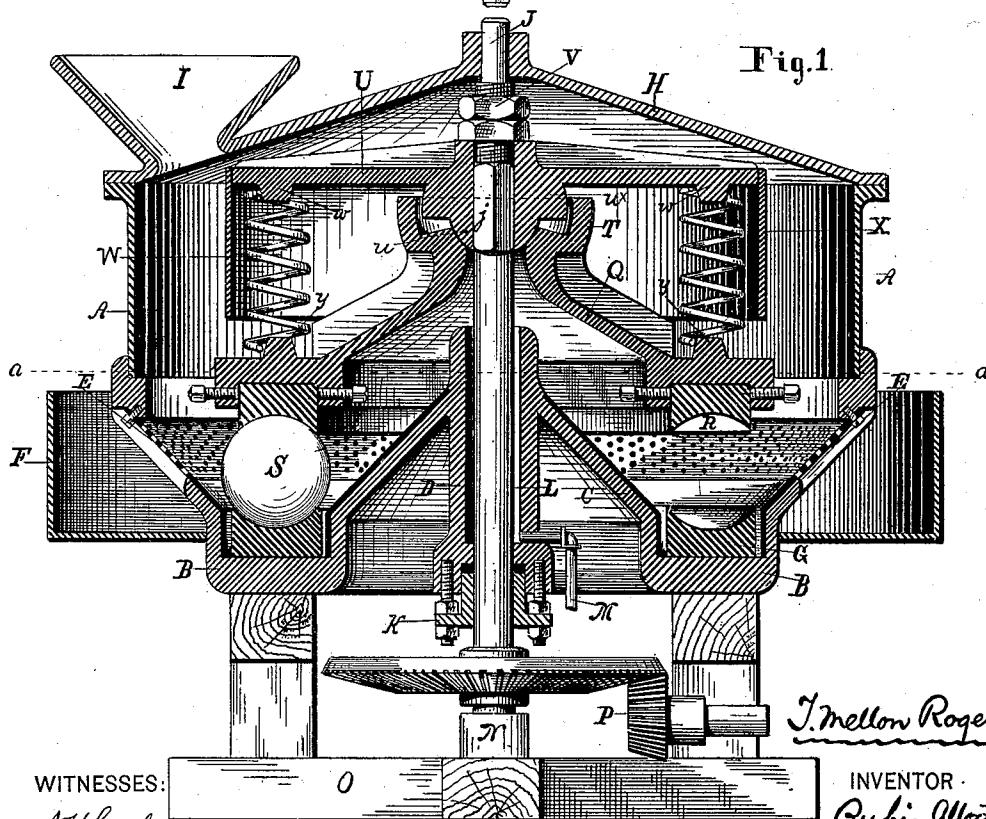


Fig. 1



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By his Attorney,
W. C. Strawbridge
Bonsall Taylor

(No Model.)

2 Sheets—Sheet 2.

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Fig. 4

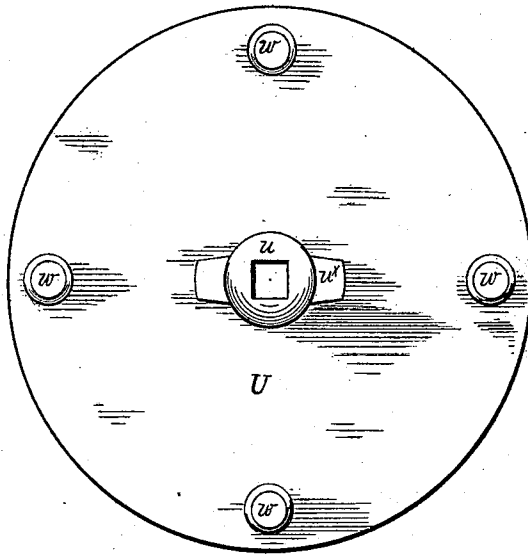
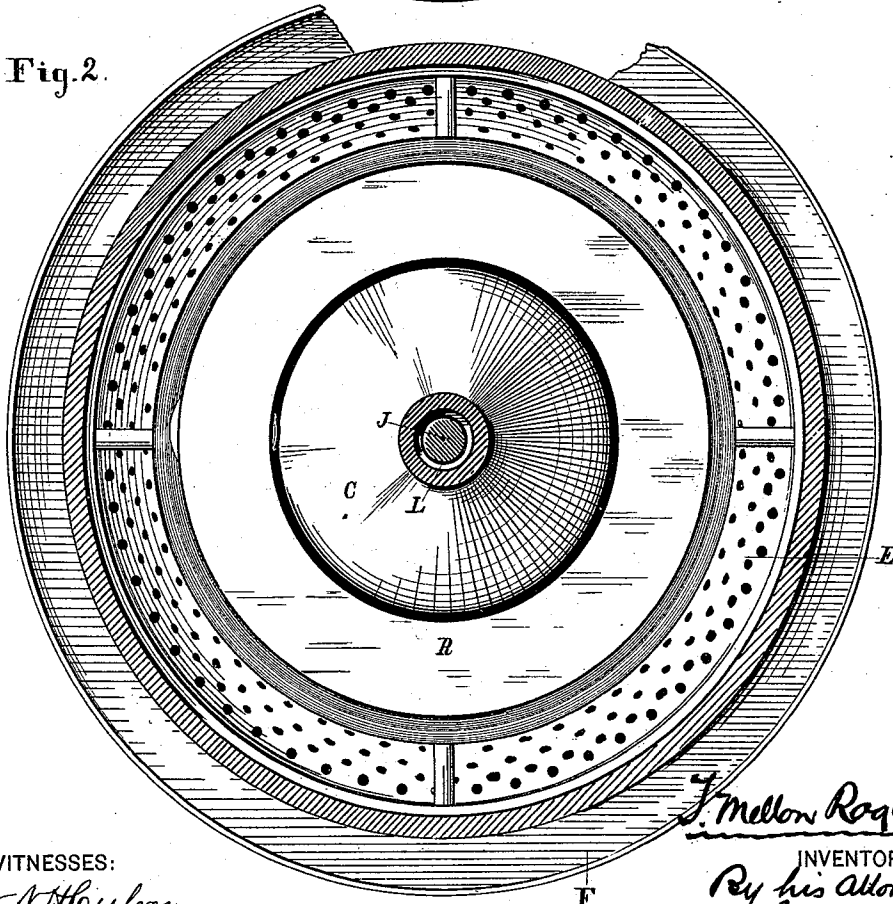


Fig. 2



WITNESSES:

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UNITED STATES PATENT OFFICE.

T. MELLON ROGERS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF
ONE-HALF TO STEPHEN P. M. TASKER, OF SAME PLACE.

PULVERIZING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 276,145, dated April 17, 1883.

Application filed January 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, T. MELLON ROGERS, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Pulverizing-Machine, of which the following is a specification.

My invention relates to a class of pulverizing-machines in which the pulverizing-instrumentality is an independent ball or crushing-sphere inclosed within a casing, and caused not only to rotate about its own axis, but also to revolve around a horizontal track in the casing, and in which said ball is permitted to move to and from the ball-track, as in passing over material of varying size, without being at any time free from the instrumentalities which occasion its compound motion.

A preferred form of a convenient embodiment of my invention is hereinafter described and claimed.

In the accompanying drawings, in which similar letters of reference indicate corresponding parts, Figure 1 is a vertical central longitudinal sectional elevation of an apparatus conveniently embodying my improvements. Fig. 2 is a top plan view of the same, the section being supposed on the horizontal plane projected on the dotted line *aa* of Fig. 1. Fig. 3 is a top plan view of the revolving oscillating disk, and Fig. 4 a bottom plan view of the driving-disk.

In the drawings, A represents a housing of cylindric form contour, of any suitable construction, and provided with a base, B, in the form of a circumferential channel having outwardly-flaring sides, of which sides the inner forms a cone, C, which supports a vertical sleeve, D, and of which the outer is provided with a circumferential screen, E, which overhangs an exterior receiver, F. Within the channel formed in the base of the housing is placed a horizontal ball-track, G, upon which the ball travels, and which is suitably retained in place in said channel.

H is the cover-plate of the housing, to which is applied a hopper, I, of any suitable construction. Vertically erected centrally within the housing is a driving-shaft, J, whose upper bearing is in the cover-plate, and which passes through a stuffing-box, K, applied to the lower extremity of the vertical sleeve D. This ver-

tical sleeve is, as to its interior diameter, greater than that of the shaft, so as to form a cylindric interspace or water-chamber, L, into which water is fed through the inlet M for the purpose of holding in suspension pulverized material and preventing it from having access to the stuffing-box of the shaft.

N is the lower bearing of the shaft, formed in the supporting frame-work O of the housing.

P is a bevel-gear suitably supported in the frame-work, and actuating the shaft to rotation.

Q is a revolving oscillating disk, preferably formed as a hollow cone surrounding the shaft, equipped as to its lower face with a revolving shoe-ring, R, which bears upon the crushing-sphere S, and at its upper extremity is conformed into a clutch-seat, T, of any preferred construction, but preferably of that represented in the drawings. This clutch-seat is conformed to receive the rounded boss *u* of a revolving driving-disk, U, which is adapted to a squared extremity, *j*, of the shaft, so as to be compelled to revolve therewith, or is otherwise suitably connected to such end, and which is provided with a clutch, *u*^{*}, which engages with the clutch-seat T of the revolving oscillating disk.

V are lock-nuts threaded upon the upper extremity of the shaft, below its upper bearing, and designed to force the driving-disk down upon the springs and oscillating disk with a predetermined pressure. The driving-disk carries a vertical depending cylindric diaphragm, X, which incloses the clutch between the disks, and also a series of vertical spiral springs, W, set between the under face of the driving-disk and the upper face of the revolving oscillating disk. These springs are held in position by bosses *w y*, respectively formed on the under face of the driving-disk and the upper face of the oscillating disk.

Having thus described a preferred construction of apparatus embodying my invention, its operation will be readily understood. Motion is imparted to the driving-shaft through the bevel-gear, and through said shaft to the driving-disk, so as to cause the latter to take on the same motion of rotation as said shaft. The revolution of the driving-disk, through the instrumentality of the clutch, occasions the revolution of the oscillating disk and the shoe-

ring, which the latter carries, with the result that such revolution, coupled with the pressure exerted upon the ball (which is in place between the ball-track and shoe-ring) by the combined weight of the oscillating disk and driving-disk, and by the pressure of the compressed springs, occasions the revolution of said ball around the ball-track at a rate proportionate to the speed at which the shaft is driven. Material fed through the hopper passes between the vertical walls or sides of the casing and the depending diaphragm of the driving-disk and gravitates upon the ball-track, with the result that complete pulverization takes place between said ball-track and the ball. The construction and adjustment of the oscillating disk are of course such as to permit of its yielding so enable the ball to travel over material of varying sizes which in its first revolution it is, perhaps, unable to crush. The pulverized material escapes through the circumferential screen into the exterior receiver, from whence it is withdrawn. If desired, sufficient water may be supplied to the water-chamber to overflow and assist in washing out the pulverized material through the screen.

The springs are made of any suitable material, may be applied in any number, and, if desired, of a construction other than the spiral construction shown, although I believe the latter to be the more available. They are of such dimensions and material as to exert a predetermined pressure, calculable in terms of the power necessary to crush certain kinds of material to a certain size. The pressure upon the ball is, as stated, due to the action of the disks, springs, and lock-nuts, as herein fully explained.

As will be readily understood, the shaft may be driven from above the casing rather than from below, and the form of the casing, as well as of the disks, may be varied to an extent not interfering with that essential construction of the device which permits of the use of a horizontal ball-track, and of a pressure which is always directed in a vertical direction downward upon the crushing-sphere. I believe, however, that the construction represented is simple, inexpensive, and practical.

It is of advantage to line the base of the casing as to its flaring sides, which encircle the ball-track, with chilled iron, steel, or other facing material adapted to resist the attrition of the pulverized particles. If desired, a screen may be adapted to the cone of the base, so as to enable a central discharge.

It is competent for me to employ more than one sphere, if I so desire, although I prefer to use but one.

It is obvious that while I have specified a housing of specific contour and construction, yet, as this housing simply forms a means of supporting and containing the several assembled members of the apparatus, other forms of housing or casing may be substituted in its

stead, and that, if desired, the housing need not be inclosed, but be simply of such construction and arrangement as provides for the support of the ball-track and screen. I have also recited lock-nuts threaded upon the upper extremity of the shaft as a means for controlling the set and pressure of the disks and springs with respect to the crushing-sphere. Other devices operating to the same result may of course be substituted in their stead. I simply instance lock-nuts as a cheap and convenient contrivance for the purpose. I have also described the oscillatory disk as provided with a shoe-ring. It is manifestly possible, however, to dispense with the shoe-ring, and to so conform and adjust said disk as to tread direct upon the crushing-sphere.

Having now described my invention, I claim and desire to secure by Letters Patent—

1. In a pulverizing-machine, the following instrumentalities in combination: first, a housing provided with a horizontal ball-track; second, an independent ball or crushing-sphere; third, a revoluble oscillatory disk; fourth, a driving-disk adapted to actuate to revolution said oscillatory disk; fifth, springs interposed between the driving-disk and the oscillatory disk; and, sixth, suitable means for occasioning the revolution of the driving-disk.

2. In a pulverizing-machine, in combination with a housing embodying a horizontal ball-track, a shaft vertically journaled through said casing, an oscillatory revoluble disk applied to said shaft and adapted to bear upon a crushing-sphere traveling upon said ball-track, a crushing-sphere, a driving-disk adapted to actuate said oscillatory disk, and means, substantially such as set forth, for adjusting the vertical set of the disks with respect to the sphere and their consequent pressure thereupon, substantially as described.

3. In a machine of the class herein recited, the combination of the driving-disk, the springs, the revoluble oscillatory disk, and a depending diaphragm adapted to inclose the springs, as and for the purposes specified.

4. In a pulverizing-machine, the combination of a driving-shaft, a revoluble oscillatory disk surrounding said shaft and provided with a clutch-seat, a driving-disk applied to said shaft, so as to be incapable of oscillation, and provided with a clutch adapted to the clutch-seat in the oscillatory disk, springs interposed between the disks, and means, substantially as set forth, for adjusting the set of the driving-disk with respect to the springs and oscillatory disk, substantially as set forth.

In testimony whereof I have hereunto signed my name this 13th day of January, A. D. 1883.

T. MELLON ROGERS.

In presence of—

J. BONSALE TAYLOR,
JOHN JOLLEY, Jr.